HITACHI

PA | **No. 0129**

27MMV40B

SERVICE MANUAL

NTSC | **PA2-FV**

R/C: CLU-433PC
R/C: CLU-433MC

Models 27MMV40B and 27MMV30B are in the same Solid State Color Television family. The difference between the 27MMV40B and 27MMV30B is the Child Lock Movie Rating/TV Rating. Please refer to model 27MMV30B schematics, assembly, wiring, test, and troubleshooting information when servicing model 27MMV40B. Refer to Service Manual PA No. 0103 issued in July 1998 and Service Manual PA No. 0092 issued in March 1998.

REPLACEMENT PARTS LIST

This parts list only gives parts which are different from the service manual PA No. 0092 and PA No. 0103.
PRODUCT SAFETY NOTE: Components marked with a ⚠ have special characteristics important to safety. Before replacing any of these components, read carefully, the PRODUCT SAFETY NOTICE of this service manual. Do not degrade the safety of the receiver through improper servicing.

SYMBOL NO.	PART NO.	PART DESCRIPTION
N201	QR26893	Instruction Book English
N203	H462676	V-Chip Reference Guide
I001	CP04283	Main Micro-controller M3727IMF - 266SP

SPECIFICATIONS AND PARTS ARE SUBJECT TO CHANGE FOR IMPROVEMENT

PROJECTION COLOR TELEVISION

FEBRUARY 2000 HHEA-MANUFACTURING DIVISION

HITACHI

HITACHI

PA **No. 0103**

27MMV30B

SERVICE MANUAL

NTSC

PA2 CHASSIS

R/C: CLU-433PC
CLU-433MC

Models 27MM20BA and 27MMV30B are in the same Solid State Color Television family. The difference between the 27MM20BA and the 27MMV30B is the DDC2B and Instruction Book. Please refer to Model 27MM20B and 27MM20BA schematics, assembly, wiring, test, and troubleshooting information when servicing Model 27MMV30B. Refer to Service Manual PA No. 0092 issued in March 1998. Refer to Service Manual PA No. 0092 for the technical information regarding the "Description of Circuit" and "IC's and Transistors Functions" issued in March 1998.

REPLACEMENT PARTS LIST

This parts list only gives parts which are different from the Service Manual PA No. 0092. PRODUCT SAFETY NOTE: Components marked with a ⚠ have special characteristics important to safety. Before replacing any of these components, read carefully, the PRODUCT SAFETY NOTICE of this Service Manual. Do not degrade the safety of the receiver through improper servicing.

For 27MMV30B (Same as 27MM20BA except below parts)

SYMBOL NO.	PART NO.	DESCRIPTION
N201	QR26891	Instruction Book English
B	JK03655(H)	PA2 DDC2B P.W.B.

Above parts list of 27MMV30B plus attached replacement parts list are parts which are different from the Service Manual PA No. 0092.

SPECIFICATIONS AND PARTS ARE SUBJECT TO CHANGE FOR IMPROVEMENT

SOLID STATE COLOR TELEVISION

JULY 1998 **HHEA-MANUFACTURING DIVISION**

SAFETY PRECAUTIONS

NOTICE: Comply with all cautions and safety-related notes located on or inside the cabinet and on the chassis or picture tube.

WARNING: Since the chassis of this receiver is connected to one side of the AC power supply during operation, whenever the receiver is plugged in, service should not be attempted by anyone unfamiliar with the precautions necessary when working on this type of receiver.

The following precautions should be observed:
1. Do not install, remove, or handle the picture tube in any manner unless shatterproof goggles are worn. People not so equipped should be kept away from the picture tube while handling.
2. When service is required, an isolation transformer should be inserted between power line and the receiver before any service is performed on a "HOT" chassis receiver.
3. When replacing a chassis in the receiver, all the protective devices must be put back in place, such as barriers, nonmetallic knobs, adjustment and compartment cover-shields, isolation resistors, capacitors, etc.
4. When service is required, observe the original lead dress in the high voltage circuitry area.
5. Always use the manufacturer's replacement components. Critical components as indicated on the circuit diagram should not be replaced by another manufacturer's. Furthermore, where a short circuit has occurred, replace those components that indicate evidence of overheating.
6. Before returning a serviced receiver to the customer, the service technician must thoroughly test the unit to be certain that it is completely safe to operate without danger of electrical shock, and be sure that no protective device built into the receiver by the manufacturer has become defective, or inadvertently defeated during servicing.

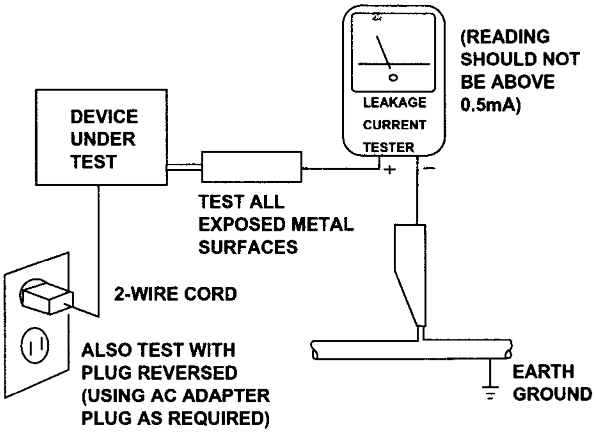
Therefore, the following checks should be performed for the continued protection of the customer and service technician.

Leakage Current Cold Check

With the AC plug removed from the 120V AC 60Hz source, place a jumper across the two plug prongs. Using an insulation tester (DC500V), connect one lead to the jumpered AC plug and touch the other lead to each exposed metal part (antennas, screwheads, metal overlays, control shafts, etc.), particularly any exposed metal part having a return path to the chassis should have a minimum resistor reading of 0.24MΩ and a maximum resistor reading of 12MΩ . Any resistance value below or above this range indicates an abnormality which requires corrective action. An exposed metal part having a return path to the chassis will indicate an open circuit.

Leakage Current Hot Check

Plug the AC line cord directly into a 120V AC 60Hz outlet (do not use an isolation transformer for this check). Turn the AC power ON. Using a Leakage Current Tester (Simpson's Model 229 or equivalent), measure for current from all exposed metal parts of the cabinet (antennas, screwheads, overlays, control shafts, etc.) particularly any exposed metal part having a return path to the chassis or to a known earth ground (water pipe, conduit, etc.). Any current measured must not exceed 0.5 milliamps.


DEVICE UNDER TEST
LEAKAGE CURRENT TESTER
(READING SHOULD NOT BE ABOVE 0.5mA)
+
−
TEST ALL EXPOSED METAL SURFACES
2-WIRE CORD
ALSO TEST WITH PLUG REVERSED (USING AC ADAPTER PLUG AS REQUIRED)
EARTH GROUND

AC LEAKAGE TEST

ANY MEASUREMENTS NOT WITHIN THE LIMITS OUTLINED ABOVE ARE INDICATIVE OF A POTENTIAL SHOCK HAZARD AND MUST BE CORRECTED BEFORE RETURNING THE RECEIVER TO THE CUSTOMER.

High Voltage

This receiver is provided with a hold down circuit for clearly indicating that voltage has increased in excess of a predetermined value. Comply with all notes described in this service manual regarding this hold down circuit when servicing, so that this hold down circuit is operated correctly.

Serviceman Warning

With minimum BRIGHTNESS and CONTRAST, the operating high voltage in this receiver is lower than 34.0kV. In case any component having influence on the high voltage is replaced, confirm that high voltage with minimum BRIGHTNESS and CONTRAST is lower than 34.0kV. To measure high voltage use a High Impedance High Voltage meter. Connect (-) to chassis earth and (+) to the CRT Anode button. (See the following connection diagram).

NOTE: Turn power switch OFF without fail before the connection to the Anode button is made.

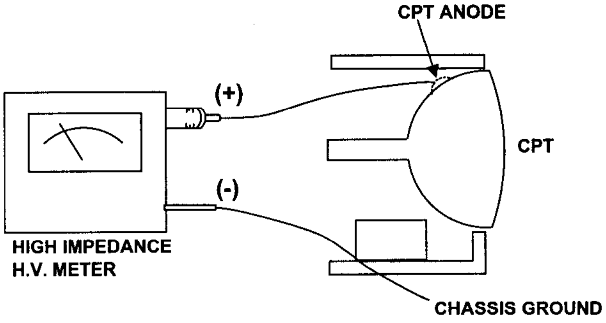
PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in HITACHI television receivers have special safety-related characteristics. These are often not evident from visual inspection nor can the protection afforded by them necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this Service Manual.

Electrical components having such features are identified with an ⚠ mark in the schematics and parts list in this Service Manual.

The use of a substitute replacement component which does not have the same safety characteristics as the HITACHI-recommended replacement component, shown in the parts list in this Service Manual, may create shock, fire, X-Radiation, or other hazards.

Production safety is continuously under review and new instructions are issued from time to time. For the latest information, always consult the current HITACHI Service Manual. A subscription to, or additional copies of HITACHI Service Manuals may be obtained at a nominal charge from HITACHI Sales Corporation.



X-Radiation

TUBE: The primary source of X-Radiation in this receiver is the picture tube. The tube utilized in this chassis is specially constructed to limit X-Radiation emissions. For continued X-Radiation protection, the replacement tube must be the same type as the original HITACHI-approved type.

When troubleshooting and making test measurements in a receiver with an excessive high voltage problem, avoid being unnecessarily close to the picture tube and the high voltage component.

Do not operate the chassis longer than is necessary to locate the cause of excessive voltage.

This Service Manual is intended for qualified service technicians; it is not meant for the casual do-it-yourselfer. Qualified technicians have the necessary test equipment and tools, and have been trained to properly and safely repair complex products such as those covered by this manual. Improperly performed repairs can adversely affect the safety and reliability of the product and may void warranty. Consumers should not risk trying to do the necessary repairs and should refer to a qualified service technician.

WARNING

Lead in solder used in this product is listed by the California Health and Welfare agency as a known reproductive toxicant which may cause birth defects or other reproductive harm (California Health and Safety Code, Section 25249.5).

When servicing or handling circuit boards and other components which contain lead in solder, avoid unprotected skin contact with solder. Also, when soldering do not inhale any smoke or fumes produced.

SAFETY NOTICE
USE ISOLATION TRANSFORMER WHEN SERVICING

Components having special safety characteristics identified by ⚠ on the parts list in this Model service manual and its supplements and bulletins. Before servicing this, it is important that the service technician read and follow the "Safety Precautions" and the "Product Safety Notices" in this Service Manual.

For continued X-Radiation protection, replace picture tube with original type or HITACHI equivalent type.

POWER SOURCE

This television receiver is designed to operate on 120 Volts/ 60Hz, AC house current. Insert the power cord into a 120 Volts/60Hz outlet.

NEVER CONNECT THE TV TO OTHER THAN THE SPECIFIED VOLTAGE OR TO DIRECT CURRENT.

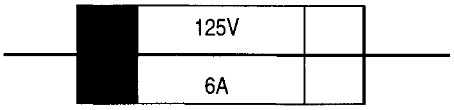
TECHNICAL SPECIFICATIONS

PICTURE TUBE

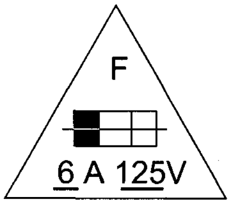
27MMV30B/PA2 . . . . .A68KSA30X(D)

CAUTION
The following symbol near the fuse indicates fast operating fuse (to be replaced). Fuse ratings appear within the symbol. **"RISK OF FIRE - REPLACE FUSE AS MARKED"**

Example:



F901



The rating of fuse F901 is 6.0A-125V.
Replace with the same type fuse for continued protection against fire.

Inputs:

- Power Input . . . . AC 120V, 60Hz
- Power Consumption (operating) . . . . 188 W
- Power Consumption (maximum) . . . . 188 W

- Antenna input impedance . . . . 75 Ohm
- Channel coverage . . . . 181 ch.
- VHF-Band. . . . . 2 ~ 13
- UHF-Band . . . . 14 ~ 69
- CATV Mid Band . . . . A-5 ~ A-1

- Super Band . . . . J-W
- Hyper Band. . . . . W+1 - W+28
- Ultra Band. W+29 - W+84

- Video input. . . . . 1.0Vp-p, 75 Ohm
- S-Video input
  Luminance (Y) . . . . 1.0Vp-p, 75 Ohm
  Chrominance (C) . . . . 0.286Vp-p, 75 Ohm
- Audio input level (average) . . 400mVrms, 47K Ohm

Outputs:

- Audio Output (variable) . . . . . . 400mVrms, 1K Ohm

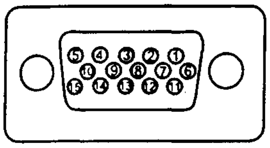
Dimensions:

• Height (in.)	23 $^{1}/_{32}$
• Width (in.)	27 $^{9}/_{32}$
• Depth (in.)	20 $^{13}/_{64}$
• Weight (lbs.)	88

VGA SPECIFICATIONS

TYPE		PS2-1	PS2-2	PS2-3
MODE		640X350	640X400	640X480
HORIZONTAL FREQUENCY		31.469Khz	31.469Khz	31.469Khz
VERTICAL FREQUENCY		70.08Hz	70.08Hz	59.94Hz
SYNC TYPE		H/V separate	H/V separate	H/V separate
SYNC POLARITY	H	TTL: positive	TTL: negative	TTL: negative
	V	TTL: negative	TTL: positive	TTL: negative

D-Sub Mini 15-Pin Connector Pin Assignments



PIN NO.	SIGNAL	PIN NO.	SIGNAL
1	Red Video	9	No Connection
2	Green Video	10	Ground
3	Blue Video	11	No Connection
4	Ground	12	No Connection
5	Ground	13	H-Sync (or H/V sync)
6	Red Ground	14	V-Sync
7	Green Ground	15	Ground
8	Blue Ground		

NOTE: Due to improvements, specifications in this operating guide are subject to change without notice.

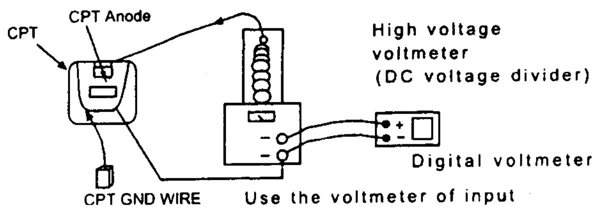
TECHNICAL CAUTIONS

HV Protection circuit operation checking.

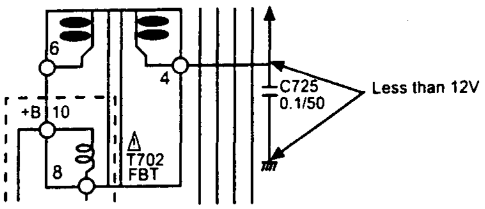
High voltage limiter circuit operation check and over voltage protection circuit operation check.

Adjustment Preparation

(1) Connect a high voltage voltmeter between CPT anode terminal (Anode cap side) and the ground as below.
(2) Set AC input voltage to 120±3V.
(3) Receive Hitachi circle pattern and set "Bright" and "CONTRAST" to max. Adjust Screen VR so that Beam Current is 1B 1.15±0. 1mA. (The voltage of ABL terminal-C725 both ends should be 12V or less)


CPT
CPT Anode
High voltage voltmeter (DC voltage divider)
Digital voltmeter
CPT GND WIRE

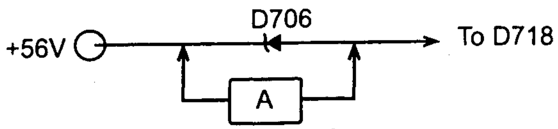
Use the voltmeter of input impedence10M ohm or more with indication to the 1st decimal place.


6
4
+B
10
8
T702
FBT
C725
0.1/50
Less than 12V

Adjustment Procedure

(1) Check that the normal High Voltage is 27.0±1.5KV and +B Voltage is 130±1.5V.

(2) Connect jig A to the Both end of R706 and check that the power is turned off.


+56V
D706
To D718
A

jig A: 10kΩ 1/8W

(3) Disconnect the AC plug and remove jig A.

AGENCY REGULATORY INFORMATION

Federal Communications Commission Notice

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio or television technician for help.

Modifications

The FCC requires the user to be notified that any changes or modifications made to this device that are not expressly approved by Hitachi Home Electronics (America), Inc. may void the user's authority to operate the equipment.

Cables

Connections to this device must be made with shielded cables with metallic RFI/EMI connector hoods to maintain compliance with FCC Rules and Regulations.

Any cables that are supplied with the system must be replaced with identical cables in order to assure compliance with FCC rules. Order Hitachi spares as replacement cables.

Declaration of Conformity

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Any cables that are supplied with the system must be replaced with identical cables in order to assure compliance with FCC rules. Order Hitachi spares as replacement cables.

For questions regarding this declaration, contact:

Hitachi Home Electronics (America), Inc.
1855 Dornoch Court
San Diego, CA 92173
1-800-448-2244 (1-800-HITACHI)
Attn: Customer Relations

REPLACEMENT PARTS LIST

PRODUCT SAFETY NOTE: Components marked with a⚠have special characters important to safety.
Before replacing any of these components, read carefully the PRODUCT SAFETY NOTICE of this service manual.
Don't degrade the safety of the receiver through improper servicing.

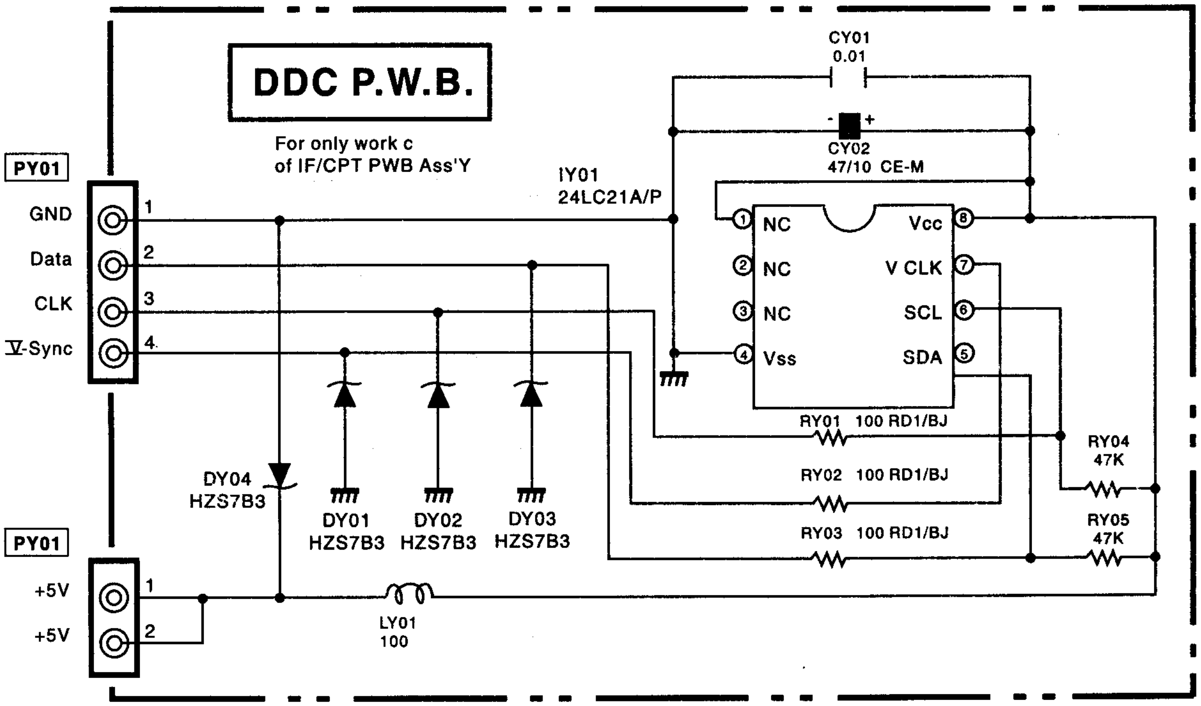
ABBREVIATIONS

Capacitors:		**Resistor:**		**Semiconductors:**	
CD:	Ceramic Disc	CF:	Carbon Film	TR:	Transistor
PF:	Polyester Film	CC:	Carbon Composition	DI:	Diode
EL:	Electrolytic	MF:	Metal Oxide Film	ZD:	Zener Diode
PP:	Polypropylene	VR:	Variable Resistor	VA:	Varistor
PR:	Paper	WW:	Wire Wound	TH:	Thermistor
TA:	Tantalum	FR:	Fuse Resistor	IC:	Integrated Circuit
TM:	Trimmer	MG:	Metal Glaze		
MC:	Mylar				

SYMBOL NO.	PART NO.	PART DESCRIPTION
		DDC2B P.W.B.
LJT0660		
CY01	0880009R	CAP.-POLYESTER 0.01UF-K 50V
CY02	0800039R	CAP.-ELECTRO. 47UF-M 10V
DY01	2339856M	ZENER HZS7B3 TA
DYO2	2339856M	ZENER HZS7B3 TA
DY03	2339856M	ZENER HZS7B3 TA
IY01	CP01042U	DIGITAL MONOLITHIC IC (24LC21A-/P)
KY51	2974432M	JUMPER WIRE (0.5 L=52MM)
KY52	2974432M	JUMPER WIRE (0.5 L=52MM)
LY01	BH00697R	COIL 100UH
PY01	2959053	5P POST PIN 4P TYPE PH
PY02	2959051	PIN POST (PH 2P)
RY01	0100041M	RES.-CARBON FLM 1/8W 100-JB
RY02	0100041M	RES.-CARBON FLM 1/8W 100-JB
RY03	0100041M	RES.-CARBON FLM 1/8W 100-JB
RY04	0700063M	RES.-CARBON FLM 1/16W 47K-JB
RY05	0700063M	RES.-CARBON FLM 1/16W 47K-JB

BASIC CIRCUIT DIAGRAM

DDC2B Circuit Schematic


DDC P.W.B.
For only work c
of IF/CPT PWB Ass'Y
PY01
GND
Data
CLK
V-Sync
1
2
3
4
PY01
+5V
+5V
1
2
IY01
24LC21A/P
CY01
0.01
CY02
47/10 CE-M
NC
NC
NC
Vss
Vcc
V CLK
SCL
SDA
RY01 100 RD1/BJ
RY02 100 RD1/BJ
RY03 100 RD1/BJ
RY04
47K
RY05
47K
DY04
HZS7B3
DY01
HZS7B3
DY02
HZS7B3
DY03
HZS7B3
LY01
100

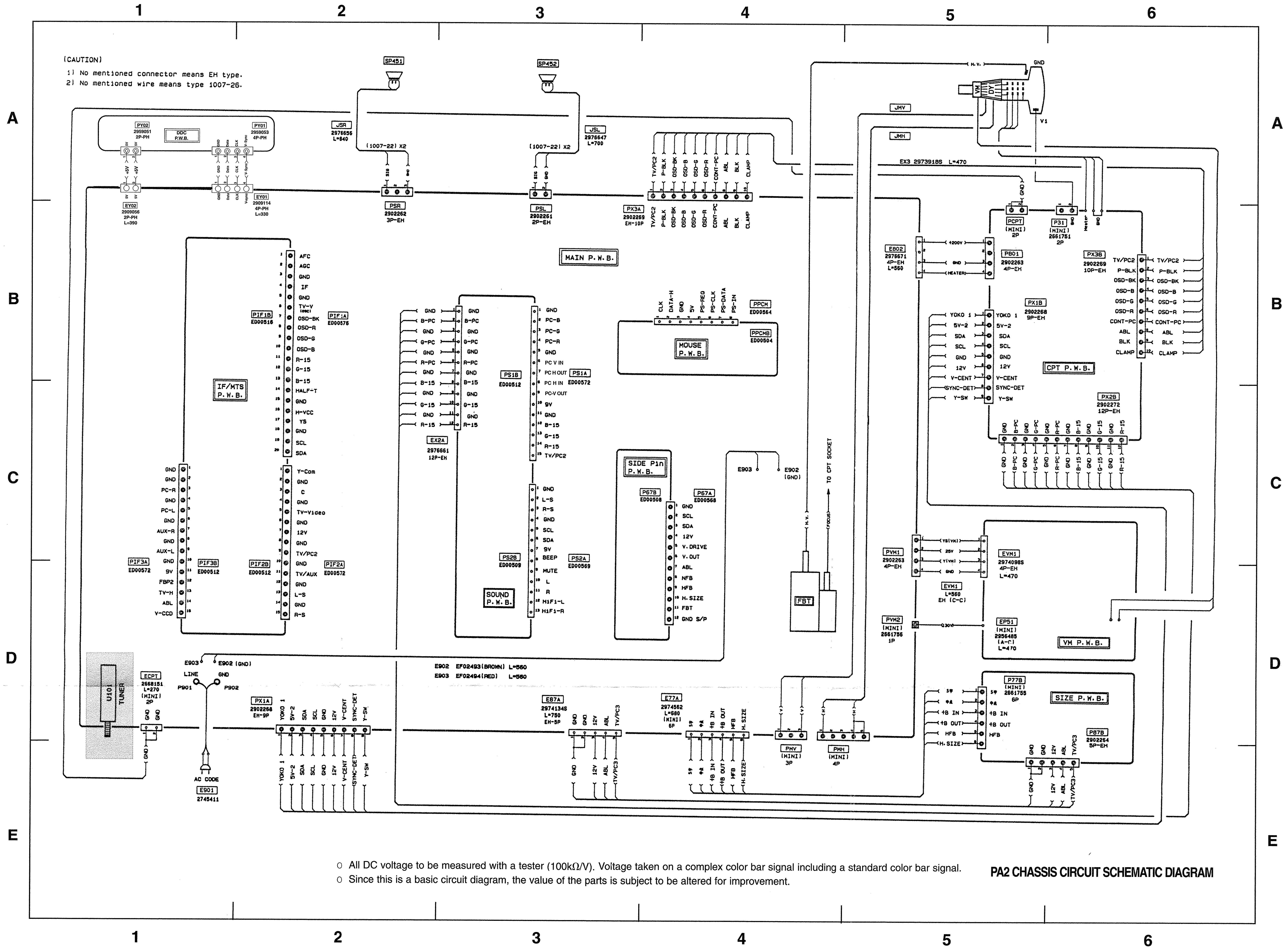
PA2 CHASSIS BLOCK DIAGRAM

PRODUCT SAFETY NOTE: Components marked with a ⚠ and shaded have special characteristics important to safety. Before replacing any of these components, read carrefully the PRODUCT SAFETY NOTICE of this Service Manual. Don't degrade the safety of the receiver through improper servicing.

- All DC voltage to be measured with a tester (100kΩ/V). Voltage taken on a complex color bar signal including a standard color bar signal.
- Since this is a basic circuit diagram, the value of the parts is subject to be altered for improvement.

PRODUCT SAFETY NOTE: Components marked with a ⚠ and shaded have special characteristics important to safety. Before replacing any of these components, read carefully the PRODUCT SAFETY NOTICE of this Service Manual. Don't degrade the safety of the receiver through improper servicing.

BASIC CIRCUIT DIAGRAM


1
2
3
4
5
6
A
B
C
D
E
SP451
SP452
PY02
DDC P.W.B.
PY01
EY02
EY01
JSR
(1007-22) X2
PSR
2902262
3P-EH
JSL
2976647
L=700
PSL
2902261
2P-EH
PX3A
2902259
EH-10P
TV/PC2
P-BLK
OSD-BK
OSD-B
OSD-G
OSD-R
CONT-PC
ABL
BLK
CLAMP
JHV
JMH
H.V.
GND
VM
DY
V1
EX3 2973918S L=470
PCPT
(MINI)
2P
P31
2661751
2P
Heater
E802
2976671
4P-EH
L=560
PB01
2902263
4P-EH
+200V
GND
HEATER
PX3B
2902259
10P-EH
PX1B
2902268
9P-EH
YOKO 1
5V-2
SDA
SCL
12V
V-CENT
SYNC-DET
Y-SW
CPT P.W.B.
PX2B
2902272
12P-EH
B-PC
G-PC
R-PC
B-15
G-15
R-15
MAIN P.W.B.
PPCM
ED00564
CLK
DATA-H
9V
PS-REQ
PS-CLK
PS-DATA
PS-IN
PPCMB
ED00504
MOUSE P.W.B.
IF/MTS P.W.B.
PIF1B
ED00516
PIF1A
ED00576
AFC
AGC
IF
TV-V
OSD-BK
OSD-R
OSD-G
OSD-B
R-15
G-15
B-15
HALF-T
H-VCC
YS
Y-Com
C
TV-Video
TV/PC2
TV/AUX
L-S
R-S
PIF3A
ED00572
PIF3B
ED00512
PIF2B
ED00512
PIF2A
ED00572
PC-R
PC-L
AUX-R
AUX-L
FBP2
TV-H
V-CCD
EX2A
2976661
12P-EH
PS1B
ED00512
PS1A
ED00572
PC V IN
PC H OUT
PC H IN
PC-V OUT
PS2B
ED00509
PS2A
ED00569
BEEP
MUTE
L
R
HiFi-L
HiFi-R
SOUND P.W.B.
SIDE Pin P.W.B.
P67B
ED00508
P67A
ED00568
V.DRIVE
V.OUT
NFB
HFB
H.SIZE
FBT
GND S/P
E903
E902 (GND)
TO CPT SOCKET
FOCUS
FBT
PVM1
2902263
4P-EH
YB(VM)
28V
Y(VM)
EVM1
2974098S
4P-EH
L=470
EVM1
L=560
EH (C-C)
PVM2
(MINI)
2661756
1P
EP51
(MINI)
2956485
(A-C)
L=470
VM P.W.B.
ECPT
2568151
L=270
(MINI)
2P
U101
TUNER
E903
E902 (GND)
LINE
P901
P902
AC CODE
E901
2745411
PX1A
2902268
EH-9P
E902 EF02493(BROWN) L=560
E903 EF02494(RED) L=560
E87A
2974134S
L=750
EH-5P
TV/PC3
E77A
2974562
L=580
(MINI)
6P
+B IN
+B OUT
PMV
(MINI)
3P
PMH
(MINI)
4P
P77B
(MINI)
2661755
6P
SIZE P.W.B.
P87B
2902264
5P-EH

(CAUTION)
1) No mentioned connector means EH type.
2) No mentioned wire means type 1007-26.

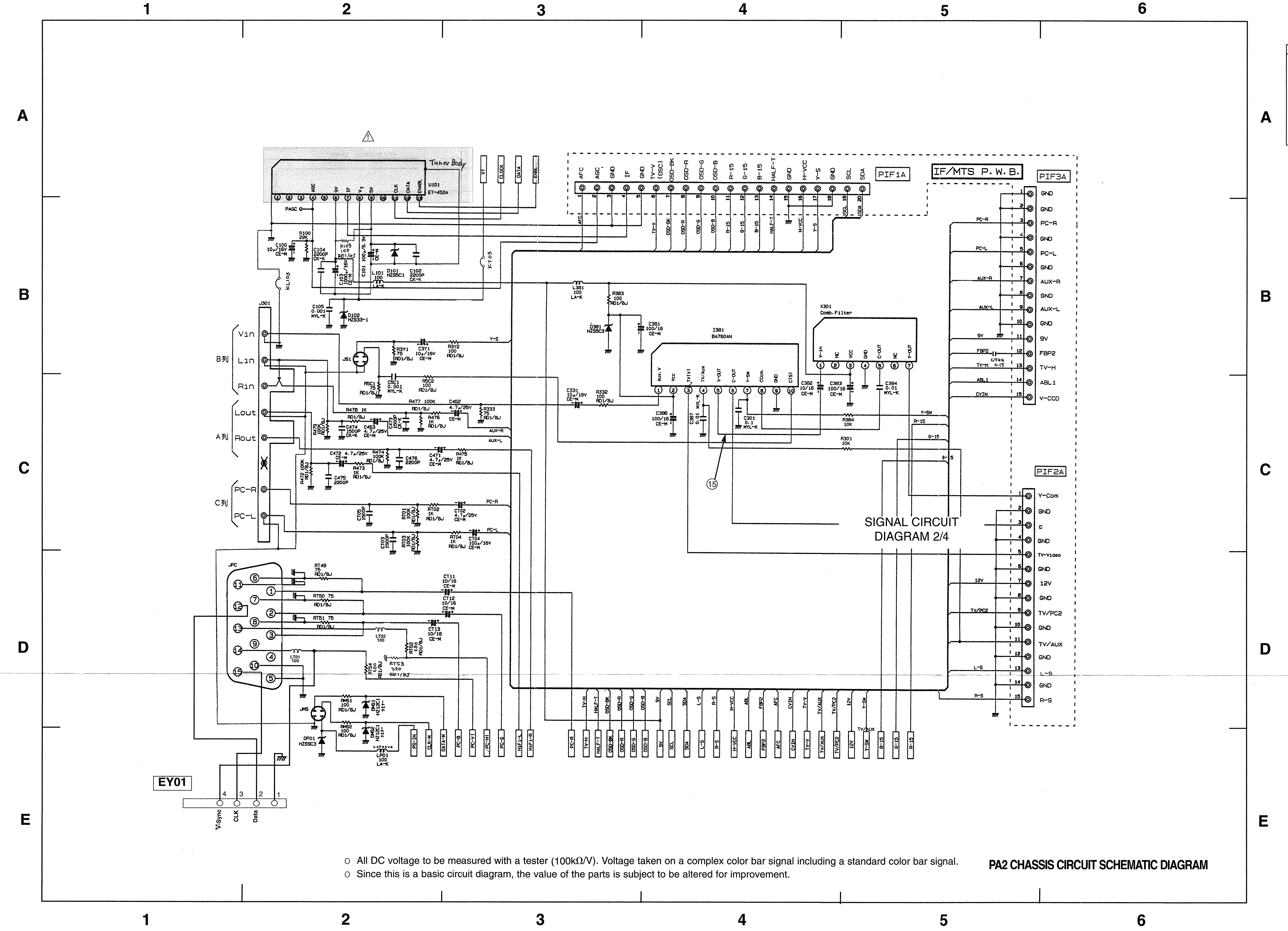
○ All DC voltage to be measured with a tester (100kΩ/V). Voltage taken on a complex color bar signal including a standard color bar signal.
○ Since this is a basic circuit diagram, the value of the parts is subject to be altered for improvement.

PA2 CHASSIS CIRCUIT SCHEMATIC DIAGRAM

BASIC CIRCUIT DIAGRAM

PRODUCT SAFETY NOTE: Components marked with a ⚠ and shaded have special characteristics important to safety. Before replacing any of these components, read carefully the PRODUCT SAFETY NOTICE of this Service Manual. Don't degrade the safety of the receiver through improper servicing.

circuit no.	pin no.	DC voltage
I381	1	2.59v
	2	5.35v
	3	2.56v
	4	0.90v
	5	1.83v
	6	1.83v
	7	0.95v
	8	2.55v
	9	0v
	10	2.59v


1
2
3
4
5
6
A
B
C
D
E
⚠
Tuner Body
U101
ET-452A
VT
CLOCK
DATA
ENBL
AFC
AGC
GND
IF
GND
TV-V
OSD-BK
OSD-R
OSD-G
OSD-B
R-15
G-15
B-15
HALF-T
H-VCC
Y-S
SCL
SDA
PIF1A
IF/MTS P. W. B.
PIF3A
GND
PC-R
PC-L
AUX-R
AUX-L
9V
FBP2
TV-H
ABL1
V-CCD
PIF2A
Y-Com
C
TV-Video
12V
TV/PC2
TV/AUX
L-S
R-S
J301
Vin
Lin
Rin
Lout
Rout
PC-R
PC-L
B列
A列
C列
Y-S
L381
R383
D381
C381
I381
BA7604N
X301
Comb.Filter
Y-in
NC
VCC
GND
C-OUT
Y-OUT
C302
C383
C384
R384
R301
C331
R332
C386
C387
C301
⑮
SIGNAL CIRCUIT
DIAGRAM 2/4
JPC
JHS
DF01
LP01
LT01
LT02
EY01
4
3
2
1
V-Sync
CLK
Data

○ All DC voltage to be measured with a tester (100kΩ/V). Voltage taken on a complex color bar signal including a standard color bar signal.

○ Since this is a basic circuit diagram, the value of the parts is subject to be altered for improvement.

PA2 CHASSIS CIRCUIT SCHEMATIC DIAGRAM

PRODUCT SAFETY NOTE: Components marked with a ⚠ and shaded have special characteristics important to safety. Before replacing any of these components, read carefully the PRODUCT SAFETY NOTICE of this Service Manual. Don't degrade the safety of the receiver through improper servicing.

BASIC CIRCUIT DIAGRAM

circuit no.	pin no.	DC voltage	
		TV mode	PC mode
I001	1	4.18v	4.05
	2	4.72v	4.72v
	3	2.54v	2.54v
	4	4.94v	4.9v
	5	3.72v	1.85v
	6	4.97v	0.38v
	7	0v	0v
	8	4.89v	4.73v
	9	4.99v	4.95v
	10	0v	4.86v
	11	0v	1.74v
	12	0v	0v
	13	0v	0v
	14	0v	0v
	15	4.97v	4.93v
	16	4.97v	4.94v
	17	4.98v	4.94v
	18	4.98v	4.94v
	19	2.11v	2.81v
	20	2.11v	2.79v
	21	0.16v	0.1v
	22	2.17v	1.52v
	23	0v	0v
	24	2.21v	2.4v
	25	1.8v	1.81v

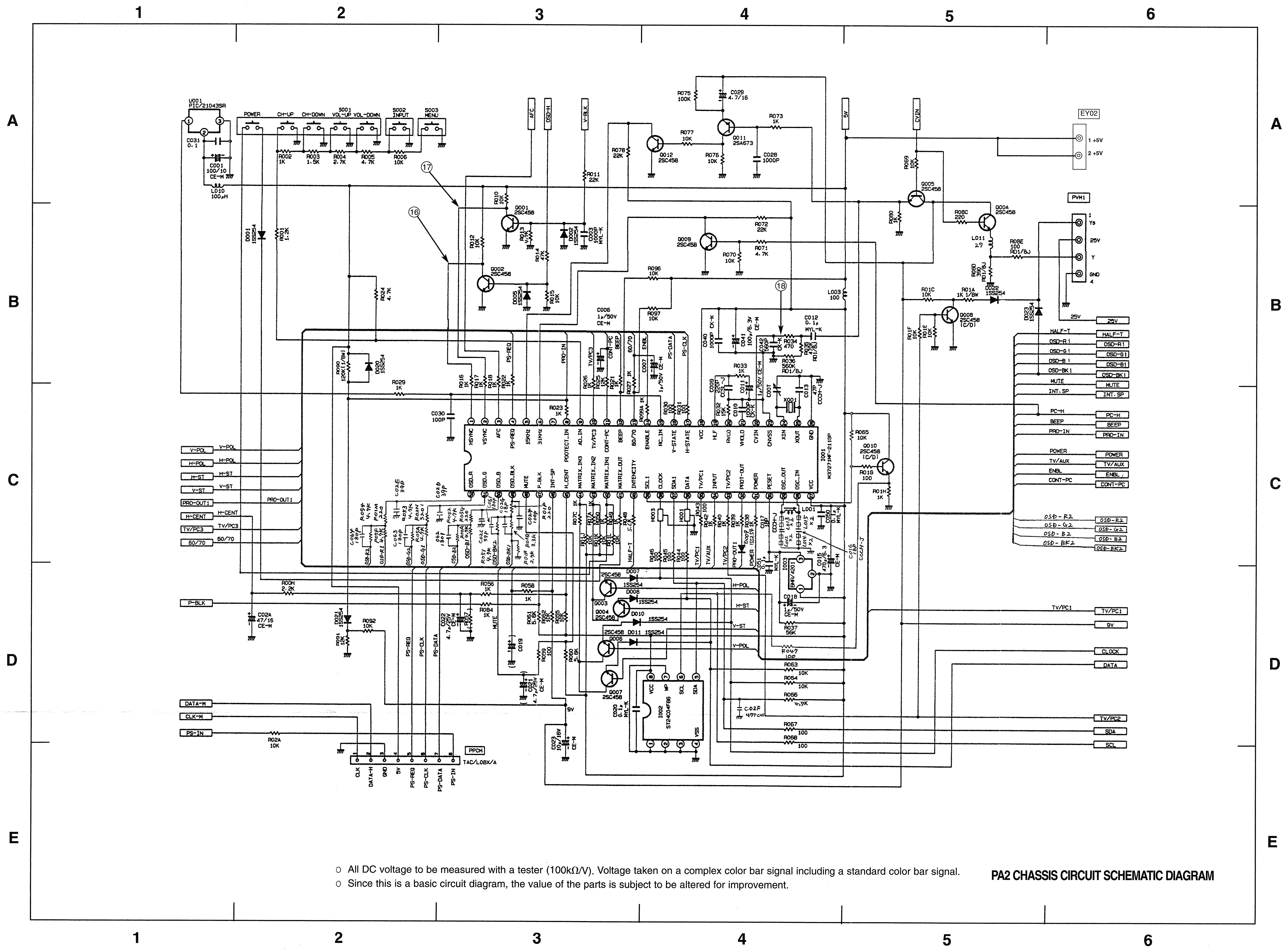
circuit no.	pin no.	DC voltage	
		TV mode	PC mode
I001	26	0v	0v
	27	4.98v	4.94v
	28	4.98v	3.17v
	29	4.98v	3.12v
	30	4.96v	4.92v
	31	4.96v	4.92v
	32	0v	0v
	33	4.91v	0v
	34	0v	0v
	35	0v	4.93v
	36	1.21v	1.2v
	37	4.54v	4.3v
	38	0v	0.1v
	39	4.16v	4.3v
	40	0v	0v
	41	0v	0v
	42	4.98v	4.94v
	43	4.98v	1.27v
	44	4.98v	1.28v
	45	0.86v	0.87v
	46	0v	0v
	47	0v	0v
	48	0v	0v
	49	0v	0v
	50	0v	0v
	51	0v	0v
	52	0v	0v

circuit no.	pin.no.	DC voltage
I 002	1	0v
	2	0v
	3	0v
	4	0v
	5	4.5v
	6	3.6v
	7	0v
	8	4.98v

circuit no.	pin no.	DC voltage
I 003	1	4.98v
	2	0v
	3	4.95v

circuit no.	pin no.	DC voltage
Q001	b	0v
	c	4.72v
	e	0v
circuit no.	pin no.	DC voltage
Q002	b	0v
	c	4.18v
	e	0v

circuit no.	pin no.	DC voltage	
		TV mode	PC mode
Q003	b	0v	1.61v
	c	4.98v	0.9v
	e	0v	0.9v
Q004	b	0.1v	1.58v
	c	4.98v	0.9v
	e	0v	0.9v


1
2
3
4
5
6
A
B
C
D
E
U001 PIC/21043SR
POWER
CH-UP
CH-DOWN
S001 VOL-UP
VOL-DOWN
S002 INPUT
S003 MENU
C031 0.1
C001 100/10 CE-M
L010 100μH
R002 1K
R003 1.5K
R004 2.7K
R005 4.7K
R006 10K
AFC
OSD-H
V-BLK
5V
CVIN
EY02
1 +5V
2 +5V
PVH1
1 Ys
25V
Y
GND 4
R075 100K
C029 4.7/16
R073 1K
Q011 2SA673
R077 10K
Q012 2SC458
R078 22K
R076 10K
C028 1000P
R011 22K
Q001 2SC458
Q002 2SC458
Q005 2SC458
Q004 2SC458
Q009 2SC458
Q008 2SC458 (C/D)
Q010 2SC458 (C/D)
R072 22K
R071 4.7K
R070 10K
R096 10K
R097 10K
L003 100
L011 27
R08C 220
R08E 100 RD1/8J
R01C 10K
R01A 1K 1/8W
D022 1SS254
D023 1SS254
D020 1SS254
D002 1SS254
D005 1SS254
D001 1SS254
(17)
(16)
(18)
C006 1μ/50V CE-M
C012 0.1μ MYL-K
C030 100P
X001
I001 M37271MF-211SP
HSYNC
VSYNC
AFC
PS-REQ
15KHZ
31KHZ
PROTECT_IN
AD_IN
TV/PC3
CONT-PC
BEEP
60/70
ENABLE
RC_IN
V-STATE
H-STATE
VCC
HLF
AVCC
VHOLD
CVIN
CNVSS
XIN
XOUT
GND
OSD_R
OSD_G
OSD_B
OSD_BLK
MUTE
INT-SP
H_CENT
MATRIX_IN3
MATRIX_IN2
MATRIX_IN1
MATRIX_OUT
INTENCITY
SCL1
CLOCK
SDA1
DATA
TV/PC1
INPUT
TV/PC2
PROT-OUT
POWER
RESET
OSC_OUT
OSC_IN
VCC
V-POL
H-POL
H-ST
V-ST
PRO-OUT1
H-CENT
TV/PC3
60/70
P-BLK
DATA-M
CLK-M
PS-IN
R02A 10K
C02A 47/16 CE-M
R004 2.2K
R092 10K
R091 10K
PPCH
TAC/L08X/A
CLK
DATA-M
GND
5V
PS-REQ
PS-CLK
PS-DATA
PS-IN
D007
D008
D010
D011 1SS254
Q003 2SC458
Q004 2SC458
Q006 2SC458
Q007 2SC458
I002 ST24C04FB6
VCC
WP
SCL
SDA
VSS
I003
C02F 47P
C023 10/16V CE-M
R037 56K
R063 10K
R064 10K
R066 4.7K
R067 100
R068 100
25V
HALF-T
OSD-R1
OSD-G1
OSD-B1
OSD-BK1
MUTE
INT.SP
PC-H
BEEP
PRO-IN
POWER
TV/AUX
ENBL
CONT-PC
OSD-R2
OSD-G2
OSD-B2
OSD-BK2
TV/PC1
9V
CLOCK
DATA
TV/PC2
SDA
SCL

- All DC voltage to be measured with a tester (100kΩ/V). Voltage taken on a complex color bar signal including a standard color bar signal.
- Since this is a basic circuit diagram, the value of the parts is subject to be altered for improvement.

PA2 CHASSIS CIRCUIT SCHEMATIC DIAGRAM

circuit no.	pin no.	DC voltage
Q005	b	2.17v
	c	9.21v
	e	1.52v

circuit no.	pin no.	DC voltage	
		TV mode	PC mode
Q006	b	0v	1.61v
	c	4.98v	0.9v
	e	0v	0.9v
Q007	b	0v	1.57v
	c	4.98v	0.9v
	e	0v	0.9v

circuit no.	pin no.	DC voltage	
Q008	b	0.66v	0v
	c	0v	9.21v
	e	0v	0v
Q009	b	0.1v	0.56v
	c	4.97v	0.38v
	e	0v	0v
Q010	b	*4.2v	*4.3v
	c	4.98v	4.94v
	e	*3.5v	*3.3v
Q011	b	1.54v	1v
	c	0.3v	0.6v
	e	1.69v	1.51v
Q012	b	0.1v	0.45v
	c	3.72v	1.95v
	e	0v	0v
Q00A	b	1.8v(TV)	
	c	9.2v(TV)	
	e	1.6v(TV)	

WIRING DRAWING OF 27MMV30B FINAL ASSEMBLY

Instruction

A) Please prepare two sets of binders attach as it shows on the next drawing.

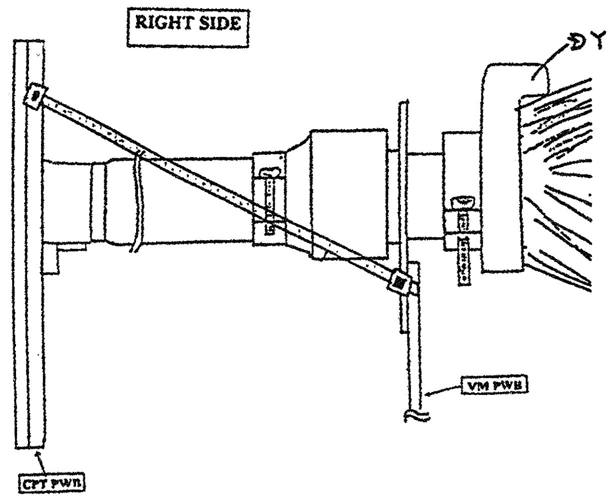
INSERT THE TIP ON
THE OTHER BINDER

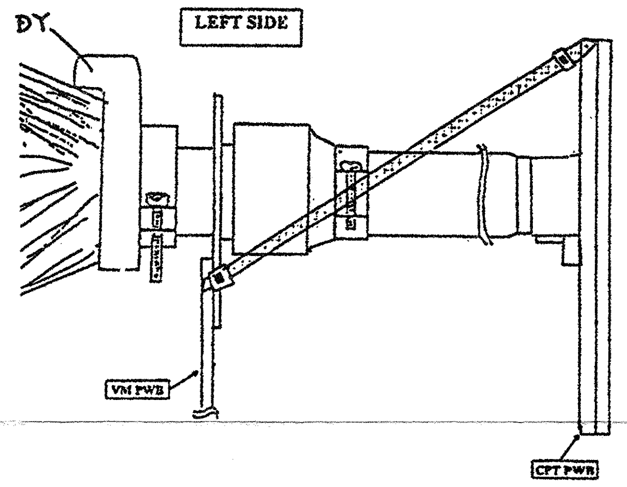
B) Using a set of binders insert one tip of the set in the left top side of the CPT PWB and the other tip insert in the left top side of the VM PWB.

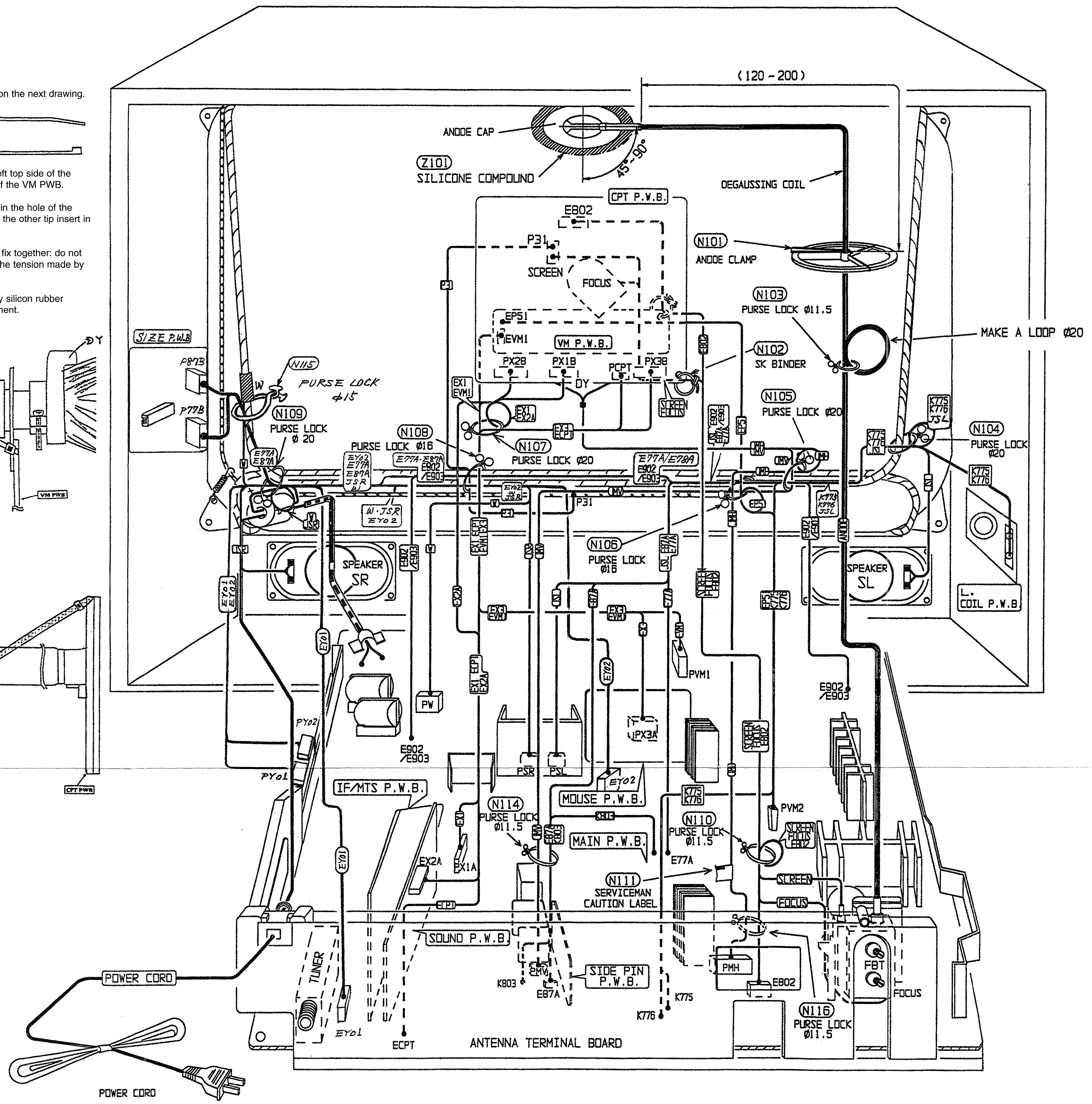
C) Using the other set of binders insert one tip of the set in the hole of the CPT sheild NCPT mark as Q857 (sheild marking) and the other tip insert in the right top side of the VM PWB.

D) Adjust the binders so that the PWB's (CPT & VM) are fix together: do not pull too much the binders this can crack the PWB by the tension made by the binders.

E) After fixing the CPT PWB & the VM PWB please apply silicon rubber between the CPT socket and the CPT to avoid movement.

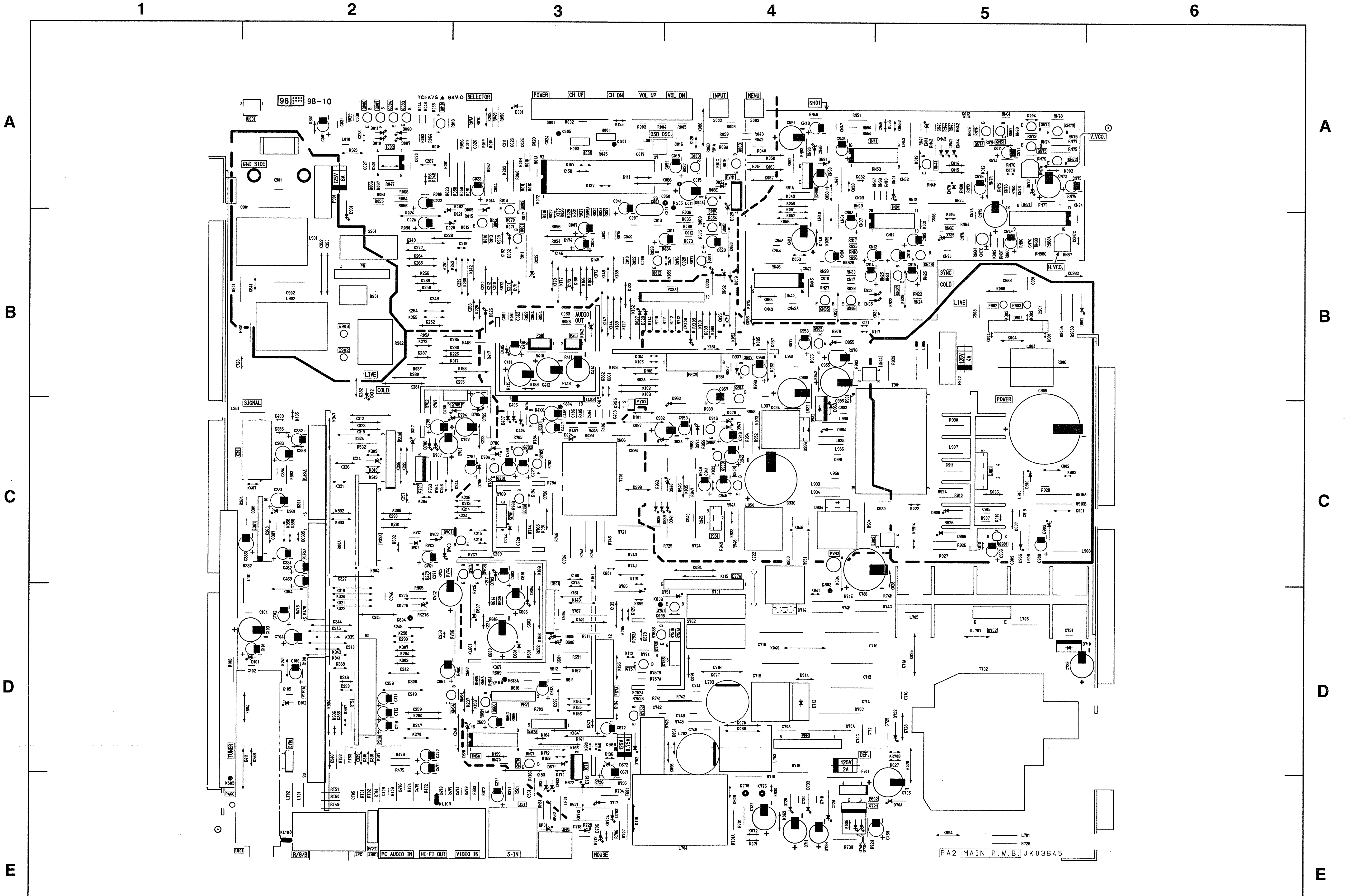

RIGHT SIDE
DY
VM PWB
CPT PWB


LEFT SIDE
DY
VM PWB
CPT PWB


(120 ~ 200)
ANODE CAP
Z101
SILICONE COMPOUND
45~90°
DEGAUSSING COIL
CPT P.W.B.
E802
P31
SCREEN
FOCUS
N101
ANODE CLAMP
N103
PURSE LOCK Ø11.5
MAKE A LOOP Ø20
N102
SK BINDER
N105
PURSE LOCK Ø20
N104
PURSE LOCK
Ø20
EP51
EVM1
VM P.W.B.
PX2B
PX1B
PCPT
PX3B
DY
SIZE P.W.B
P87B
P77B
N115
PURSE LOCK
Ø15
N109
PURSE LOCK
Ø 20
N108
PURSE LOCK Ø16
N107
PURSE LOCK Ø20
P31
N106
PURSE LOCK
Ø16
SPEAKER
SR
SPEAKER
SL
L.
COIL P.W.B.
PVM1
E902
/E903
PW
PX3A
PSR
PSL
EY02
MOUSE P.W.B.
N114
PURSE LOCK
Ø11.5
MAIN P.W.B.
N110
PURSE LOCK
Ø11.5
E77A
PVM2
N111
SERVICEMAN
CAUTION LABEL
SCREEN
FOCUS
IF/MTS P.W.B.
PY02
PY01
EX2A
PX1A
ECPT
SOUND P.W.B.
SIDE PIN
P.W.B.
K803
E87A
K775
K776
PMH
E802
FBT
FOCUS
N116
PURSE LOCK
Ø11.5
TUNER
EY01
ECPT
ANTENNA TERMINAL BOARD
POWER CORD
POWER CORD

PRODUCT SAFETY NOTE: Components marked with a ⚠ and shaded have special characteristics important to safety. Before replacing any of these components, read carefully the PRODUCT SAFETY NOTICE of this Service Manual. Don't degrade the safety of the receiver through improper servicing.

PRINTED CIRCUIT BOARD

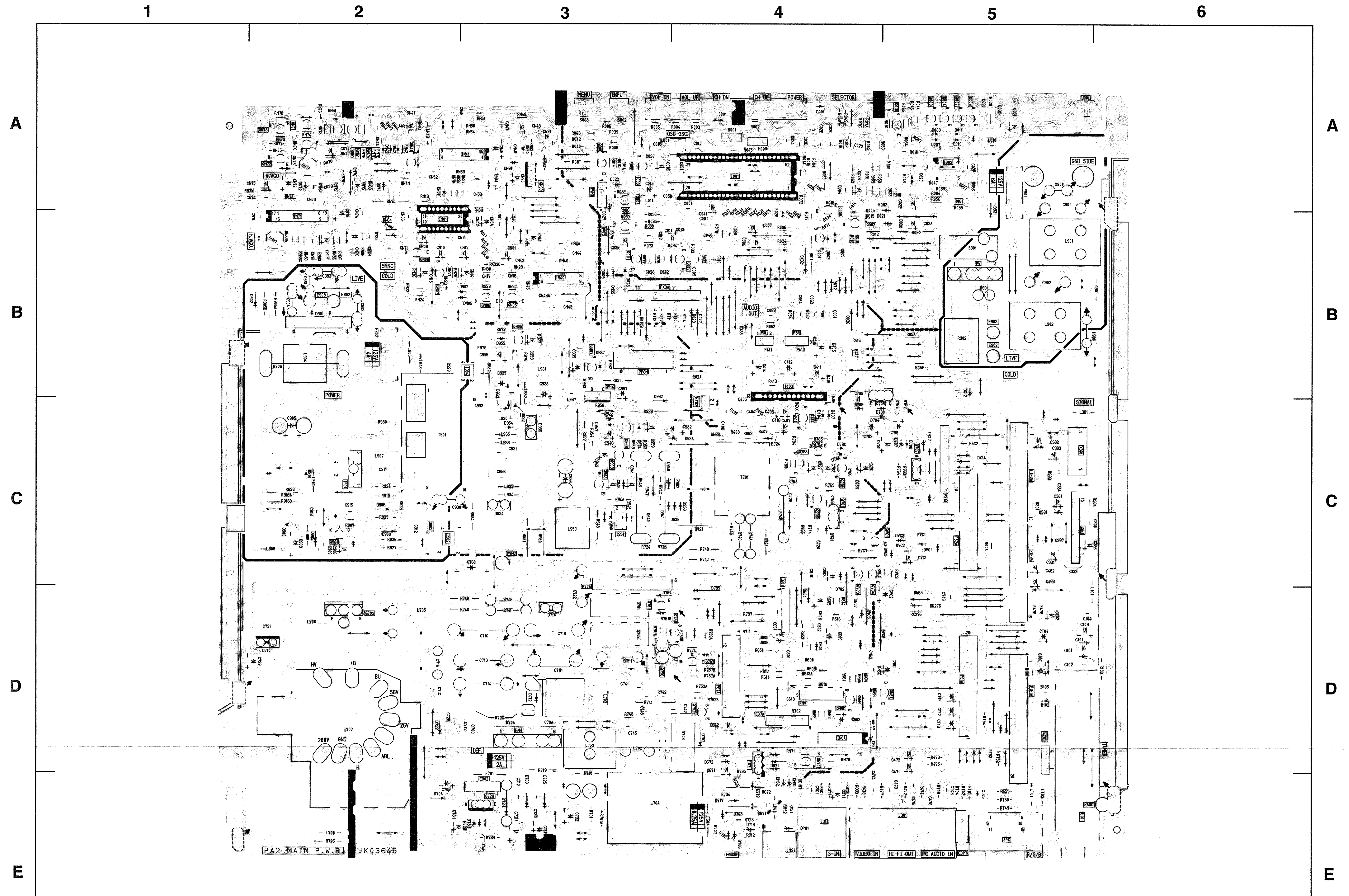

1
2
3
4
5
6
A
B
C
D
E
98-10
TCI-A7S ⚠ 94V-0
SELECTOR
POWER
CH UP
CH DN
VOL UP
VOL DN
INPUT
MENU
NH01
V.VCO.
OSD OSC.
GND SIDE
AUDIO OUT
H.VCO.
SYNC
COLD
LIVE
SIGNAL
POWER
TUNER
DEF.
R/G/B
PC AUDIO IN
HI-FI OUT
VIDEO IN
S-IN
MOUSE
PA2 MAIN P.W.B. JK03645

- All DC voltage to be measured with a tester (100kΩ/V). Voltage taken on a complex color bar signal including a standard color bar signal.
- Since this is a basic circuit diagram, the value of the parts is subject to be altered for improvement.

PA2 MAIN P.W.B COMPONENT SIDE

PRINTED CIRCUIT BOARD

PRODUCT SAFETY NOTE: Components marked with a ⚠ and shaded have special characteristics important to safety. Before replacing any of these components, read carefully the PRODUCT SAFETY NOTICE of this Service Manual. Don't degrade the safety of the receiver through improper servicing.


1
2
3
4
5
6
A
B
C
D
E
MENU
INPUT
VOL DN
VOL UP
CH DN
CH UP
POWER
SELECTOR
OSD OSC.
GND SIDE
V.VCO
SYNC
COLD
LIVE
POWER
125V 4A
SIGNAL
LIVE
COLD
AUDIO OUT
HV
+B
BU
56V
26V
200V
GND
ABL
125V 2A
PA2 MAIN P.W.B.
JK03645
S-IN
VIDEO IN
HI-FI OUT
PC AUDIO IN
R/G/B

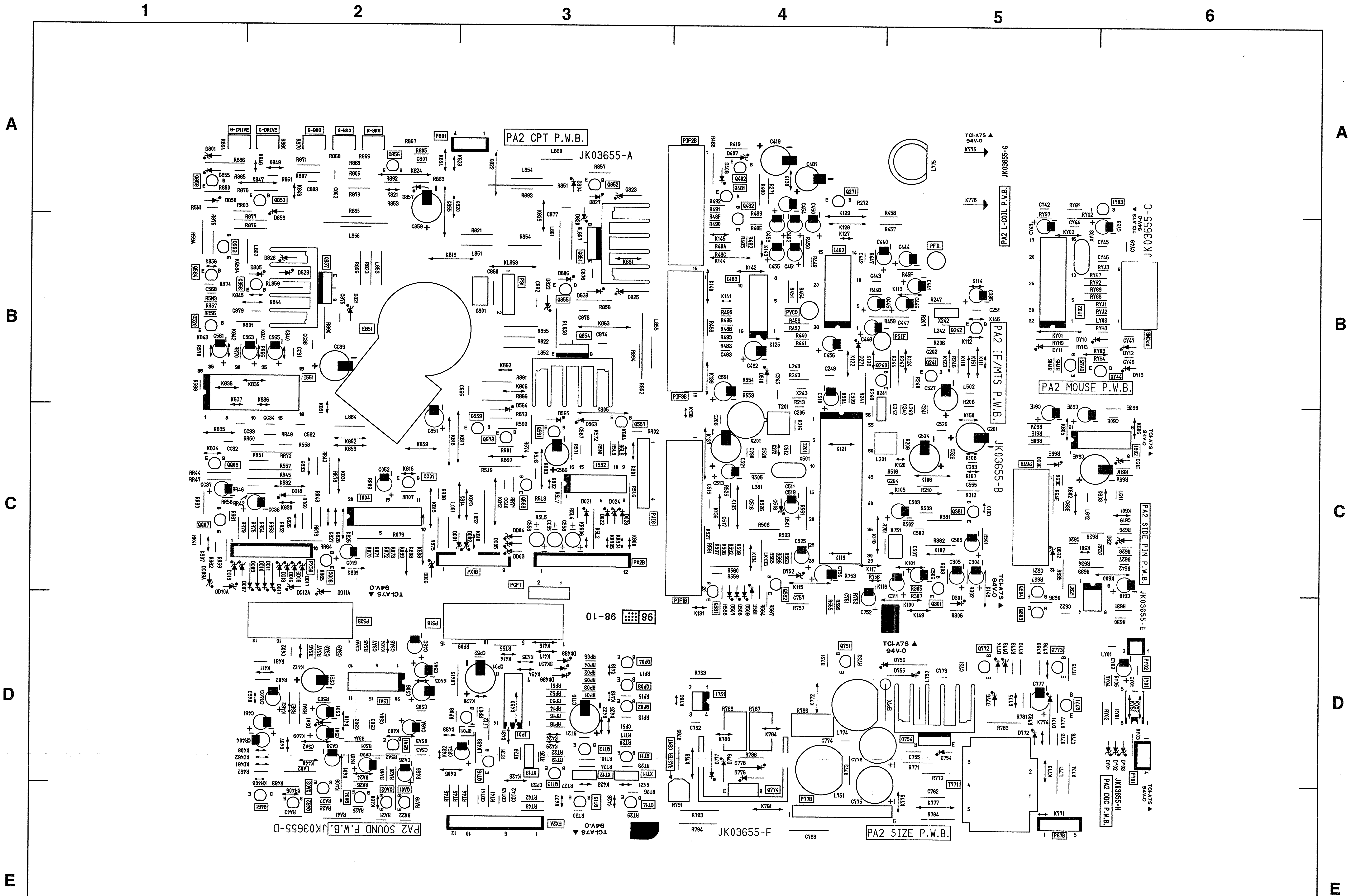
- All DC voltage to be measured with a tester (100kΩ/V). Voltage taken on a complex color bar signal including a standard color bar signal.
- Since this is a basic circuit diagram, the value of the parts is subject to be altered for improvement.

PA2 MAIN P.W.B. PATTERN SIDE

1
2
3
4
5
6

PRODUCT SAFETY NOTE: Components marked with a ⚠ and shaded have special characteristics important to safety. Before replacing any of these components, read carefully the PRODUCT SAFETY NOTICE of this Service Manual. Don't degrade the safety of the receiver through improper servicing.

PRINTED CIRCUIT BOARD

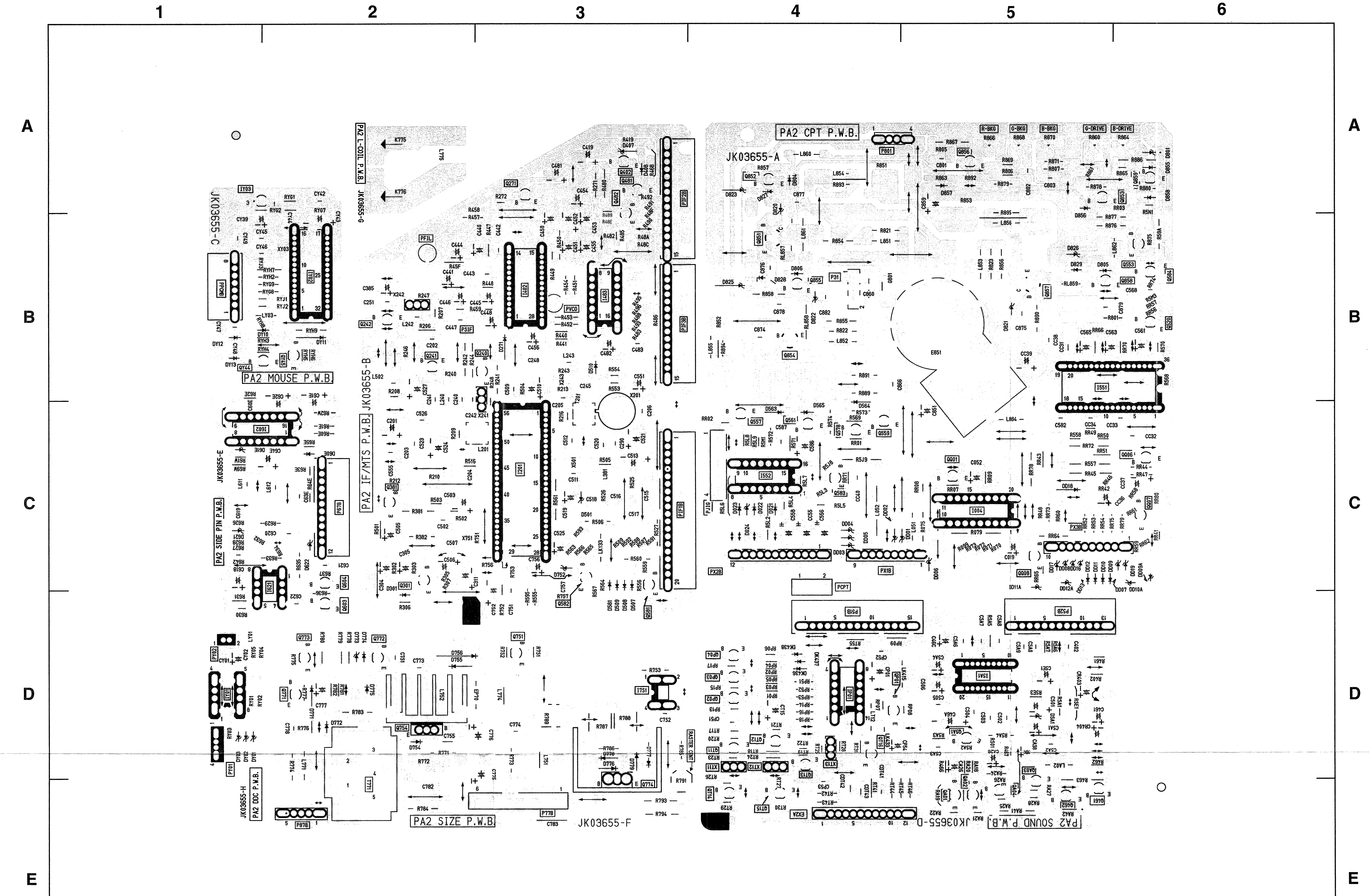

1
2
3
4
5
6
A
B
C
D
E
PA2 CPT P.W.B.
JK03655-A
PA2 IF/MTS P.W.B.
JK03655-B
PA2 MOUSE P.W.B.
JK03655-C
PA2 SOUND P.W.B.
JK03655-D
PA2 SIDE PIN P.W.B.
JK03655-E
JK03655-F
PA2 SIZE P.W.B.
PA2 L-COIL P.W.B.
JK03655-G
PA2 DDC P.W.B.
JK03655-H
TC-A7S
94V-0
98-10

- All DC voltage to be measured with a tester (100kΩ/V). Voltage taken on a complex color bar signal including a standard color bar signal.
- Since this is a basic circuit diagram, the value of the parts is subject to be altered for improvement.

PA2 SUB P.W.B. COMPONENT SIDE

PRINTED CIRCUIT BOARD

PRODUCT SAFETY NOTE: Components marked with a ⚠ and shaded have special characteristics important to safety. Before replacing any of these components, read carefully the PRODUCT SAFETY NOTICE of this Service Manual. Don't degrade the safety of the receiver through improper servicing.


1
2
3
4
5
6
A
B
C
D
E
PA2 CPT P.W.B.
JK03655-A
R-BKG
G-BKG
B-BKG
G-DRIVE
B-DRIVE
PA2 L-COIL P.W.B.
JK03655-G
PA2 MOUSE P.W.B.
JK03655-C
PA2 IF/MTS P.W.B.
JK03655-B
PA2 SIDE PIN P.W.B.
JK03655-E
PA2 DDC P.W.B.
JK03655-H
PA2 SIZE P.W.B.
JK03655-F
RASTER CENT
PA2 SOUND P.W.B.
JK03655-D

- All DC voltage to be measured with a tester (100kΩ/V). Voltage taken on a complex color bar signal including a standard color bar signal.
- Since this is a basic circuit diagram, the value of the parts is subject to be altered for improvement.

PA2 SUB P.W.B. PATTERN SIDE

NOTES:

HITACHI

HITACHI

PA **No. 0092**

27MM20B
27MM20BA

NTSC *PA-1/PA-2 Chassis*

R/C: CLU-433PC
CLU-433MC

SAFETY PRECUATIONS 1
PRODUCT SAFETY 2
AGENCY REGULATORY INFORMATION 3
TECHNICAL SPECIFICATIONS 4
TECHNICAL CAUTIONS 5
CONTENTS OF ADJUSTMENTS AND CIRCUIT DESCRIPTION 6
FRONT PANEL AND REMOTE CONTROL OPERATION 9
ADJUSTMENTS 20
CIRCUIT DESCRIPTIONS 38
TROUBLESHOOTING 61
WAVEFORMS 69
REPLACEMENT PARTS LIST 75
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BASIC CIRCUIT DIAGRAM 113

CAUTION: Before servicing this chassis, it is important that the service technician read the “Product Safety Notices” in this service manual.

SAFETY NOTICE
USE ISOLATION TRANSFORMER WHEN SERVICING

Components having special safety characteristics are identified by a ⚠ on the parts list in this Service Data and its supplements and bulletins. Before servicing the chassis, it is important that the service technician read and follow the “Safety Precautions” and “Product Safety Notices” in this Service Manual.

SPECIFICATIONS AND PARTS ARE SUBJECT TO CHANGE FOR IMPROVEMENT

MARCH 1998 HHEA-MANUFACTURING DIVISION

SAFETY PRECAUTIONS

NOTICE: Comply with all cautions and safety-related notes located on or inside the cabinet and on the chassis or picture tube.

WARNING: Since the chassis of this receiver is connected to one side of the AC power supply during operation, whenever the receiver is plugged in, service should not be attempted by anyone unfamiliar with the precautions necessary when working on this type of receiver.

The following precautions should be observed:

1. Do not install, remove, or handle the picture tube in any manner unless shatterproof goggles are worn. People not so equipped should be kept away from the picture tube while handling.
2. When service is required, an isolation transformer should be inserted between power line and the receiver before any service is performed on a "HOT" chassis receiver.
3. When replacing a chassis in the receiver, all the protective devices must be put back in place, such as barriers, nonmetallic knobs, adjustment and compartment cover-shields, isolation resistors, capacitors, etc.
4. When service is required, observe the original lead dress in the high voltage circuitry area.
5. Always use the manufacturer's replacement components. Critical components as indicated on the circuit diagram should not be replaced by another manufacturer's. Furthermore, where a short circuit has occurred, replace those components that indicate evidence of overheating.
6. Before returning a serviced receiver to the customer, the service technician must thoroughly test the unit to be certain that it is completely safe to operate without danger of electrical shock, and be sure that no protective device built into the receiver by the manufacturer has become defective, or inadvertently defeated during servicing.

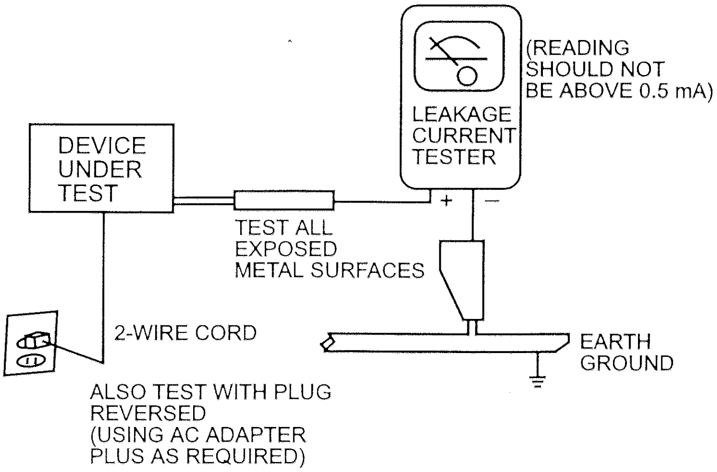
Therefore, the following checks should be performed for the continued protection of the customer and service technician.

Leakage Current Cold Check

With the AC plug removed from the 120V AC 60Hz source, place a jumper across the two plug prongs. Turn the AC power switch ON using an insulation tester (DC500V), connect one lead to the jumpered AC plug and touch the other lead to each exposed metal part (antennas, screwheads, metal overlays, control shafts, etc.), particularly any exposed metal part having a return path to the chassis should have a minimum resistor reading of 0.24Mohm and a maximum resistor reading of 12Mohm. Any resistance value below or above this range indicates an abnormality which requires corrective action. An exposed metal part having a return path to the chassis will indicate an open circuit.

Leakage Current Hot Check

Plug the AC line cord directly into a 120V AC 60Hz outlet (do not use an isolated transformer for this check). Turn the AC power ON. Using a Leakage Current Tester (Simpson's Model 229 or equivalent), measure for current from all exposed metal parts of the cabinet (antennas, screwheads, overlays, control shafts, etc.) particularly any exposed metal part having a return path to the chassis or to a known earth ground (water pipe, conduit, etc.). Any current measured must not exceed 0.5 milliamps.


(READING SHOULD NOT BE ABOVE 0.5 mA)
LEAKAGE CURRENT TESTER
DEVICE UNDER TEST
+
–
TEST ALL EXPOSED METAL SURFACES
2-WIRE CORD
EARTH GROUND
ALSO TEST WITH PLUG REVERSED (USING AC ADAPTER PLUS AS REQUIRED)

AC LEAKAGE TEST

ANY MEASUREMENTS NOT WITHIN THE LIMITS OUTLINED ABOVE ARE INDICATIVE OF A POTENTIAL SHOCK HAZARD AND MUST BE CORRECTED BEFORE RETURNING THE RECEIVER TO THE CUSTOMER.

High Voltage

This receiver is provided with a hold down circuit for clearly indicating that voltage has increased in excess of a predetermine value. Comply will all notes described in this service manual regarding this hold down circuit when servicing, so that this hold down circuit is operated correctly.

Serviceman Warning

With minimum BRIGHTNESS and CONTRAST, the operating high voltage in this receiver is lower than 37.0kV. In case any component having influence on the high voltage is replaced, confirm that high voltage with minimum BRIGHTNESS and CONTRAST is lower than 37.0kV. To measure high voltage use a High Impedance High Voltage meter. Connect (-) to chassis earth and (+) to the CRT Anode button. (See the following connection diagram.)

Note: Turn power switch OFF without fail before the connection to the Anode button is made.

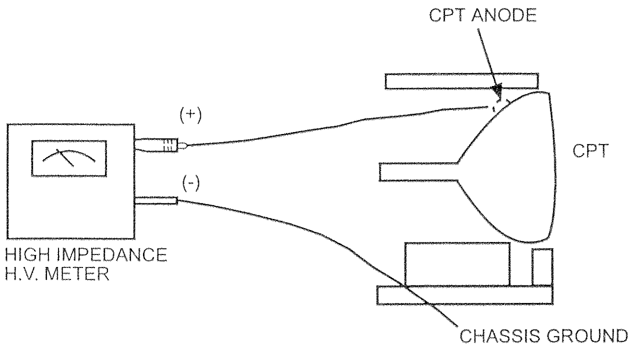
PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in HITACHI television receivers have special safety-related characteristics. These are often not evident from visual inspection nor can the protection afforded by them necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this Service Manual.

Electrical components having such features are identified with an ⚠ mark in the schematics and parts list in this Service Manual.

The use of a substitute replacement component which does not have the same safety characteristics as the HITACHI-recommended replacement component, shown in the parts list in this Service Manual, may create shock, fire, X-radiation, or other hazards.

Production safety is continuously under review and new instructions are issued from time to time. For the latest information, always consult the current HITACHI Service Manual. A subscription to, or additional copies of HITACHI Service Manuals may be obtained at a nominal charge from HITACHI Sales Corporation.



X-Radiation

TUBE: The primary source of X-Radiation in this receiver is the picture tube. The tube utilized in this chassis is specially constructed to limit X-Radiation emissions. For continued X-Radiation protection, the replacement tube must be the same type as the original HITACHI-approved type.

When troubleshooting and making test measurements in a receiver with an excessive high voltage problem, avoid being unnecessarily close to the picture tube and the high voltage component.

Do not operate the chassis longer than is necessary to locate the cause of excessive voltage.

This Service Manual is intended for qualified service technicians; it is not meant for the casual do-it-yourselfer. Qualified technicians have the necessary test equipment and tools, and have been trained to properly and safely repair complex products such as those covered by this manual. Improperly performed repairs can adversely affect the safety and reliability of the product and may void warranty. Consumers should not risk trying to do the necessary repairs and should refer to a qualified service technician.

WARNING

Lead in solder used in this product is listed by the California Health and Welfare agency as a known reproductive toxicant which may cause birth defects or other reproductive harm (California Health and Safety Code, Section 25249.5).

When servicing or handling circuit boards and other components which contain lead in solder, avoid unprotected skin contact with solder. Also, when soldering do not inhale any smoke or fumes produced.

SAFETY NOTICE USE ISOLATION TRANSFORMER WHEN SERVICING

Components having special safety characteristics identified by⚠ on the parts list in this service manual and its supplements and bulletins. Before servicing this product, it is important that the service technician read and follow the “Safety Precautions” and the “Product Safety Notices” in this Service Manual.

For continued X-Radiation protection, replace picture tube with original type or HITACHI equivalent type.

POWER SOURCE

This television receiver is designed to operate on 120 Volts/60Hz, AC house current. Insert the power cord into a 120 Volts/60Hz outlet.

NEVER CONNECT THE TV TO OTHER THAN THE SPECIFIED VOLTAGE OR TO DIRECT CURRENT.

AGENCY REGULATORY INFORMATION

Federal Communications Commission Notice

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio or television technician for help.

Modifications

The FCC requires the user to be notified that any changes or modifications made to this device that are not expressly approved by Hitachi Home Electronics (America), Inc. may void the user's authority to operate the equipment.

Cables

Connections to this device must be made with shielded cables with metallic RFI/EMI connector hoods to maintain compliance with FCC Rules and Regulations.

Any cables that are supplied with the system must be replaced with identical cables in order to assure compliance with FCC rules. Order Hitachi spares as replacement cables.

Declaration of Conformity

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Any cables that are supplied with the system must be replaced with identical cables in order to assure compliance with FCC rules. Order Hitachi spares as replacement cables.

For questions regarding this declaration, contact:

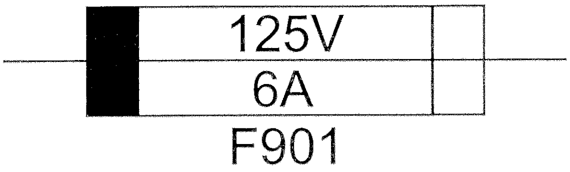
Hitachi Home Electronics (America), Inc.
1855 Dornoch Court
San Diego, CA 92173
(619) 661-0227

TECHNICAL SPECIFICATIONS

PICTURE TUBE

27MM20B/PA-1..........................A68KSA30X
27MM20BA/PA-1.......................A68KSA30X

CAUTION
The following symbol near the fuse indicates fast operating fuse (to be replaced). Fuse ratings appear within the symbol.
Example:



The rating of fuse F901 is 6.0A-125V. Replace with the same type fuse for continued protection against fire.

Inputs:
- Power Input . . . . .AC 120V, 60Hz
- Power Consumption (operating) 188W
- Power Consumption (maximum) 188W

- Antenna input impedance . . . . .75 Ohm
- Channel coverage . . . . .181 ch.
- VHF-Band . . . . .2 ~ 13
- UHF-Band . . . . .14 ~ 69
- CATV Mid Band . . . . .A-5 ~ A-1

- Super Band . . . . .J-W
- Hyper Band .W+1 - W+28
- Ultra Band .W+29 - W+84

- Video input . . . . .1.0Vp-p, 75 Ohm
- S-Video input
  Luminance (Y) . . . . .1.0Vp-p, 75 Ohm
  Chrominance (C) . . . . .0.286Vp-p, 75 Ohm
- Audio input level (average) . .400mVrms, 47K Ohm

Outputs:
- Audio Output (variable) . . . . . .400mVrms, 1K Ohm

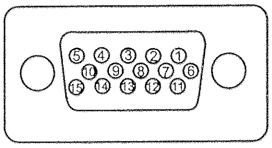
Dimensions:

• Height (in.)	$23^{1}/_{32}$
• Width (in.)	$27^{9}/_{32}$
• Depth (in.)	$20^{13}/_{64}$
• Weight (lbs.)	88

VGA SPECIFICATIONS

TYPE		PS2-1	PS2-2	PS2-3
MODE		640X350	640X400	640X480
HORIZONTAL FREQUENCY		31.469Khz	31.469Khz	31.469Khz
VERTICAL FREQUENCY		70.08Hz	70.08Hz	59.94Hz
SYNC TYPE		H/V separate	H/V separate	H/V separate
SYNC POLARITY	H	TTL: positive	TTL: negative	TTL: negative
	V	TTL: negative	TTL: positive	TTL: negative

D-Sub Mini 15-Pin Connector Pin Assignments



PIN NO.	SIGNAL	PIN NO.	SIGNAL
1	Red Video	9	No Connection
2	Green Video	10	Ground
3	Blue Video	11	No Connection
4	Ground	12	No Connection
5	Ground	13	H-Sync (or H/V sync)
6	Red Ground	14	V-Sync
7	Green Ground	15	Ground
8	Blue Ground		

NOTE: Due to improvements, specifications in this operating guide are subject to change without notice.

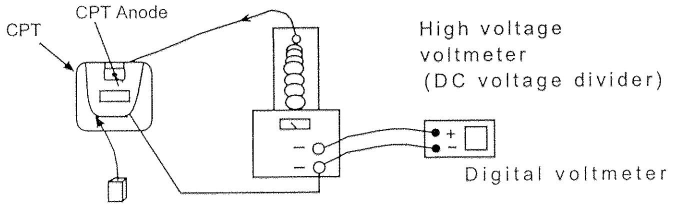
TECHNICAL CAUTIONS

HV Protection circuit operation checking.

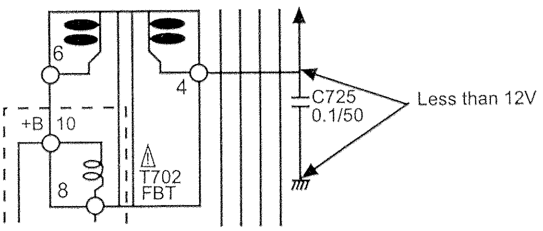
High voltage limiter circuit operation check and over voltage protection circuit operation check.

Adjustment Preparation

(1) Connect a high voltage voltmeter between CPT anode terminal (Anode cap side) and the ground as below.
(2) Set AC input voltage to 120±3V.
(3) Receive Hitachi circle pattern and set "Bright" and "CONTRAST" to max. Adjust Screen VR so that Beam Current is IB 1.15±0. 1mA. (The voltage of ABL terminal-C725 both ends should be 12V or less)


CPT Anode
CPT
High voltage voltmeter (DC voltage divider)
+
-
Digital voltmeter
CPT GND WIRE

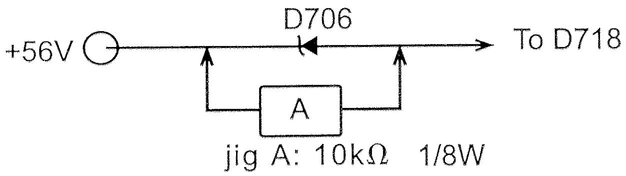
Use the voltmeter of input impedence10M ohm or more with indication to the 1st decimal place.


6
4
+B
10
8
T702
FBT
C725
0.1/50
Less than 12V

Adjustment Procedure

(1) Check that the normal High Voltage is 27.0±1.5KV and +B Voltage is 130±1.5V.

(2) Connect jig A to the both end of R706 and check that power is turned off.


+56V
D706
To D718
A
jig A: 10kΩ 1/8W

(3) Disconnect the AC plug and remove jig A.

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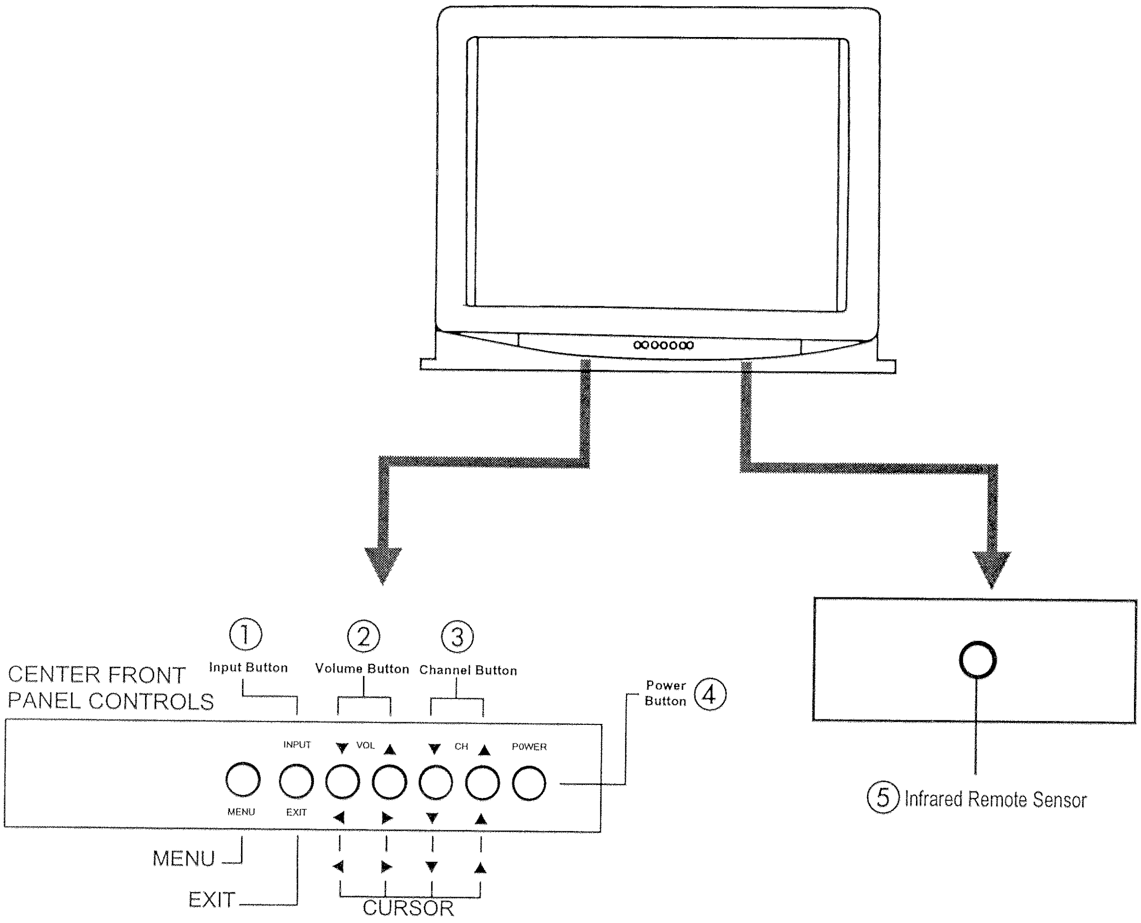
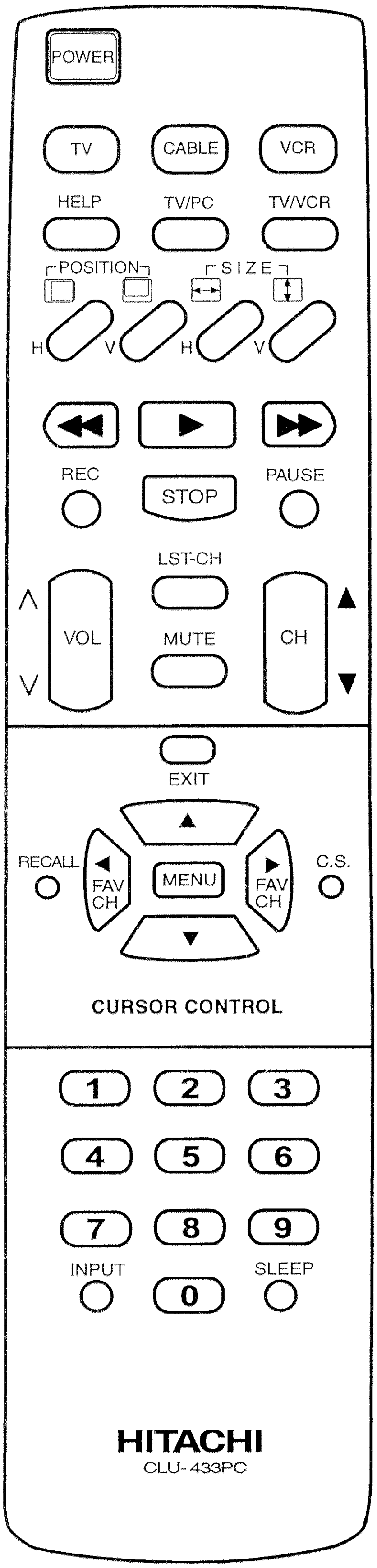
- **Front Panel and Remote Control Operation.**

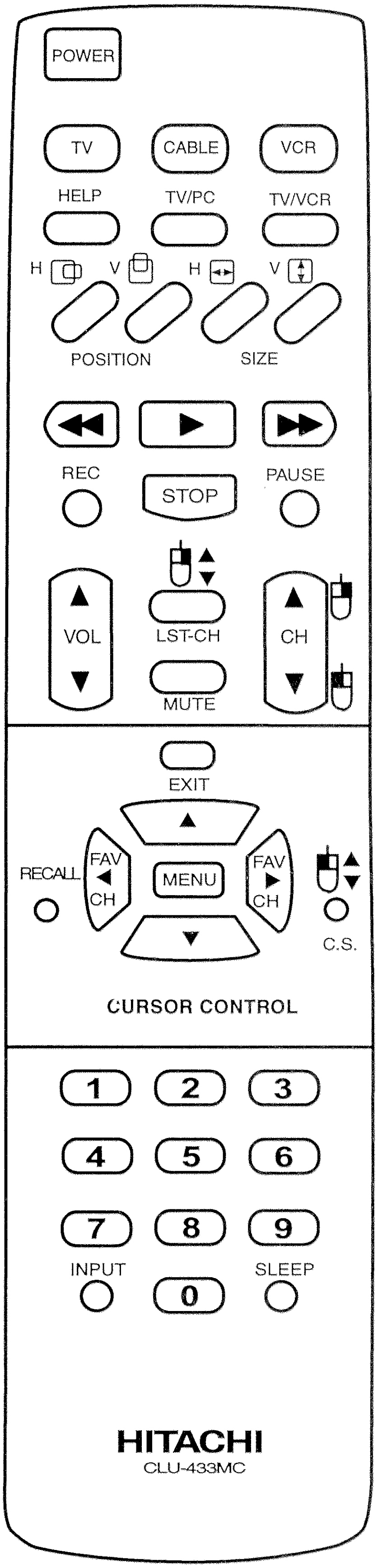
1. Front Panel Controls (refer to remote control operation for basic operation)


①
②
③
CENTER FRONT
PANEL CONTROLS
Input Button
Volume Button
Channel Button
Power
Button ④
INPUT
▼ VOL ▲
▼ CH ▲
POWER
MENU
EXIT
◀ ▶ ▼ ▲
MENU
EXIT
◀ ▶ ▼ ▲
CURSOR
⑤ Infrared Remote Sensor

2. Remote Control Operation


POWER
TV
CABLE
VCR
HELP
TV/PC
TV/VCR
POSITION
SIZE
H
V
H
V
REC
STOP
PAUSE
LST-CH
VOL
MUTE
CH
EXIT
RECALL
FAV CH
MENU
FAV CH
C.S.
CURSOR CONTROL
1
2
3
4
5
6
7
8
9
INPUT
0
SLEEP
HITACHI
CLU-433PC

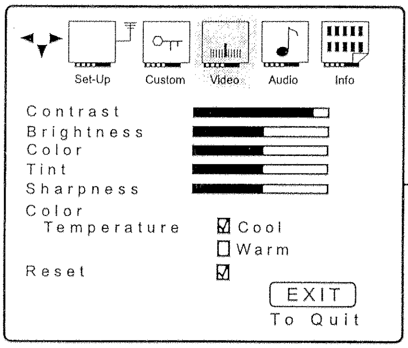
27MM20B


POWER
TV
CABLE
VCR
HELP
TV/PC
TV/VCR
H
V
H
V
POSITION
SIZE
REC
STOP
PAUSE
VOL
LST-CH
MUTE
CH
EXIT
RECALL
FAV CH
MENU
FAV CH
C.S.
CURSOR CONTROL
1
2
3
4
5
6
7
8
9
INPUT
0
SLEEP
HITACHI
CLU-433MC

27MM20BA

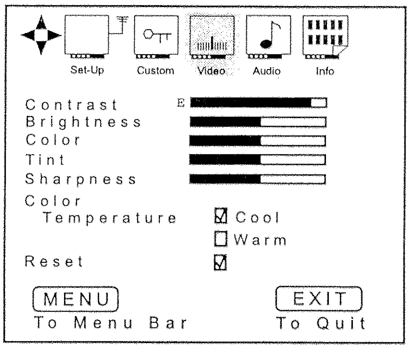
2.1 VIDEO

Select VIDEO to adjust picture settings and improve picture quality.



Contrast
Brightness
Color
Tint
Sharpness
Color Temperature ☑ Cool
☐ Warm
Reset ☑

CURSOR CONTROL



Contrast
Brightness
Color
Tint
Sharpness
Color Temperature ☑ Cool
☐ Warm
Reset ☑

Use the CURSOR ▲ or ▼ to highlight the function to be adjusted.
Press CURSOR ◀ or ▶ to adjust the function.
Press EXIT to quit menu or CURSOR ◀ to return to previous menu.

CONTRAST
Use this function to change the contrast between black and white levels in the picture.

BRIGHTNESS
Use this function to adjust overall picture brightness.

COLOR
Use this function to adjust the level of color in the picture.

TINT
Use this function to adjust flesh tones so they appear natural.

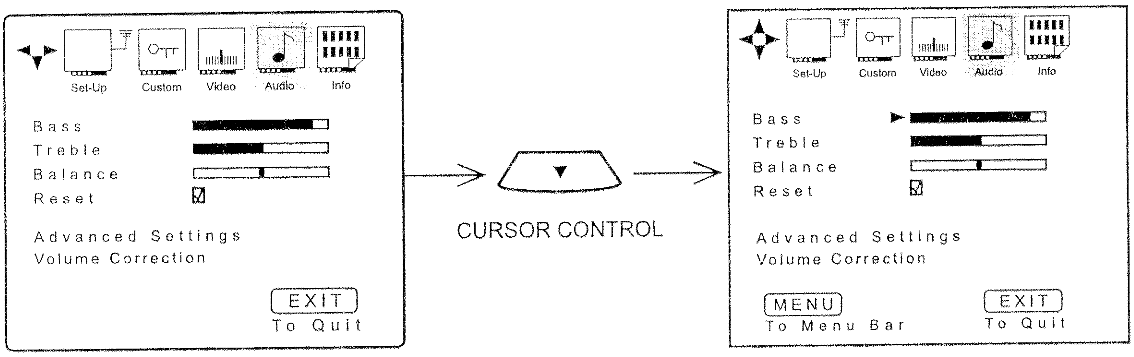
SHARPNESS
Use this function to adjust the amount of fine detail in the picture.

COLOR TEMP.
Use this function to adjust the white balance (hue) of the picture to your own color preference.
When shipped from the factory, this is set to COOL. If you prefer a reddish screen, set to WARM.

RESET
When RESET is selected, the "ARE YOU SURE?" display will appear on the screen to confirm your choice. Press CURSOR ▶ to return VIDEO adjustments to factory preset conditions.

2.2 AUDIO

Select AUDIO to adjust the TV to your preference and to improve the sound quality.


Set-Up
Custom
Video
Audio
Info
Bass
Treble
Balance
Reset ☑
Advanced Settings
Volume Correction
EXIT
To Quit
CURSOR CONTROL
Set-Up
Custom
Video
Audio
Info
Bass
Treble
Balance
Reset ☑
Advanced Settings
Volume Correction
MENU
To Menu Bar
EXIT
To Quit

Use the CURSOR ▲ or ▼ to highlight the function to be adjusted.
Press CURSOR ◀ or ▶ to adjust the function.
Press EXIT to quit menu or CURSOR ◀ to return to previous menu.

BASS

This function controls the low frequency audio to all speakers.

TREBLE

This function controls the high frequency audio to all speakers.

BALANCE

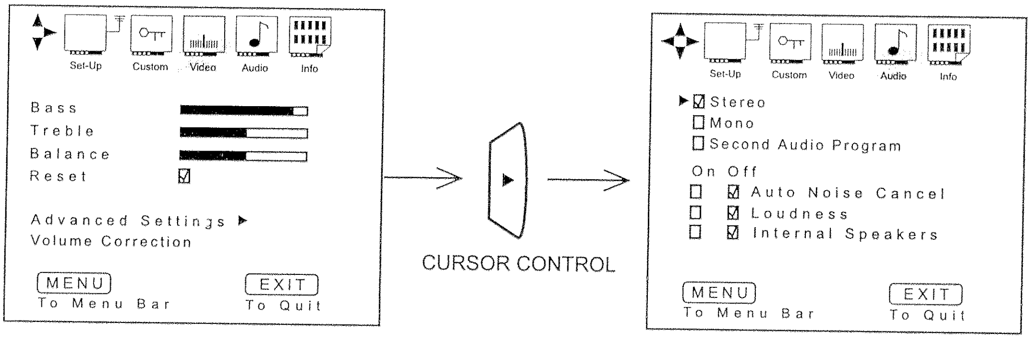
This function will control the left to right balance of the TV internal speakers and the AUDIO TO HI FI output.

RESET

When RESET is selected, the "ARE YOU SURE?" display will appear on the screen to confirm your choice. Press CURSOR ▶ to return AUDIO adjustments to factory preset conditions.

2.3 ADVANCED SETTINGS

Use ADVANCED SETTINGS to improve the sound performance of your TV depending on listening conditions.



Bass
Treble
Balance
Reset ☑

Advanced Settings ▶
Volume Correction

▶☑ Stereo
☐ Mono
☐ Second Audio Program

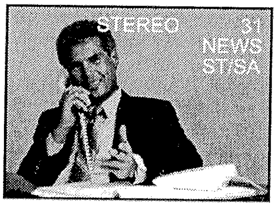
On Off
☐ ☑ Auto Noise Cancel
☐ ☑ Loudness
☐ ☑ Internal Speakers

Press CURSOR ▲ or ▼ to highlight a function.
Press CURSOR ▶ to change the function setting.
Press EXIT to quit menu or CURSOR ◀ to return to previous menu.

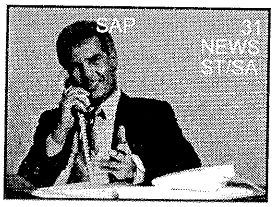
MTS MODE

Multi-Channel Television Sound (MTS) will allow you to select STEREO (Stereo Broadcast), SAP (Second Audio Program) which may be a secondary language, weather report, etc. or MONO (Monaural Sound) used when receiving a weak stereo broadcast.
The sources received will be displayed below the channel number. The MTS mode you selected will be displayed to the left of the channel number. See example below for each selection when both stereo and second audio are received (monaural is always received).

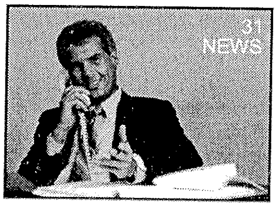
STEREO SELECTED



SAP SELECTED



MONO SELECTED



AUTO NOISE CANCEL

This function eliminates the noise in between stations. If a channel is tuned and is noisy, this function will automatically eliminate the audio for that channel.

LOUDNESS

This function will improve the quality of both low and high frequency sounds when listening at low volume levels.

INTERNAL SPEAKERS

This function is useful when first setting up the external speakers, or if you prefer to use only speakers from a separate stereo system.

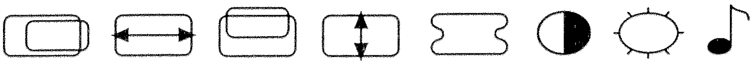
2.4 PC MODE CONTROLS

1) **MENU**

Press MENU to display PC mode On-Screen Display.

PC MAIN MENU

There are eight features that allow you to set up your multimedia vision (while in PC Mode) to your preference. Features from left to right are H Position, H Size, V Position, V Size, Pinchushion, Contrast, Brightness and Audio.



MENU
To Store

EXIT
To Quit

After completing adjustment, press MENU to store.

2) **EXIT**

Press EXIT button to exit the on-screen display.

3) **CURSORS**

Use Left/Right cursors to highlight a feature and Up/Down cursors to select the highlighted item, then use left/right cursors to adjust. These buttons are also used for mouse cursor remote control operation.

4) **TV/PC Button**

Press this button to toggle back and forth between TV and PC mode.

5) **H Position**

Press to display PC horizontal position adjustment bar. Press cursor left/right to adjust PC horizontal position.

6) **V Position**

Press to display PC vertical position adjustment bar. Press cursor left/right to adjust PC vertical position.

7) **H Size**

Press to display PC horizontal size adjustment bar. Press cursor left/right to adjust PC horizontal size.

8) **V Size**

Press to display PC vertical size adjustment bar. Press cursor left/right to adjust PC vertical size.

9) **LAST CHANNEL (LST-CH) Button**

Press to perform mouse right button drag, toggle.

10) **C.S. Button**

Press to perform left button drag, toggle.

11) **Channel Up/Down Button**

Use the channel up (▲) button to perform a right click. Use the channel down (▼) button to perform a left click.

Note: 1. This monitor can display only VGA formats:

PS2-1 640 X 350 (horizontal frequency: 31.469kHZ, vertical frequency: 70.08Hz)
PS2-2 640 X 400 (horizontal frequency: 31.469kHZ, vertical frequency: 70.08Hz)
PS2-3 640 X 480 (horizontal frequency: 31.469KhZ, vertical frequency: 59.94Hz)

THIS MONITOR WILL NOT DISPLAY VGA SETTINGS ON A SVGA OR HIGHER RESOLUTION NOTEBOOK PC, IF YOU USE THE BUILT-IN LCD DISPLAY AT THE SAME TIME WITH THE MONITOR.

If PC display setting is wrong the monitor will display: "Please set PC for 640x480 display."

2. This monitor uses PS/2 format for the mouse interface. On some PC's, the mouse control may not work in the following situations:
   - Disconnecting and reconnecting mouse cable while TV and PC power is turned on.
   - Turning on the PC power before turning on the TV power.
   - Operating systems other than Windows 3.1x and Windows 95.

Consult your PC operation manual for the keyboard keys to re-start or shutdown your computer.

3. PC MODE CONNECTION AND OPERATION

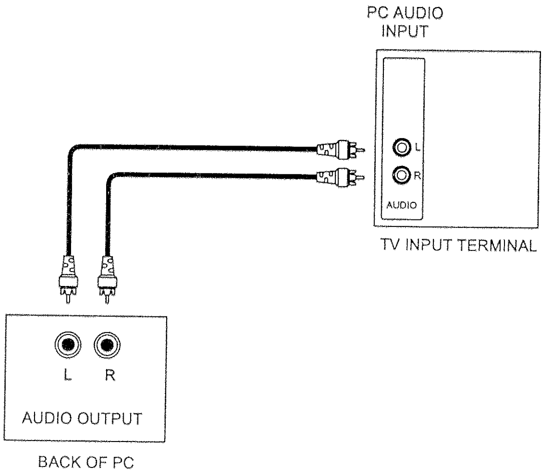
IMPORTANT: TURN POWER OFF ON THE TV/PC MONITOR AND THE PC BEFORE CONNECTING OR DISCONNECTING ANY CABLES.

3.1 PC MOUSE CONTROL OPERATION

1. Connect the 6 pin-din cable (provided) to the PC and monitor.
2. Turn the TV/PC monitor power on.
3. Press the input button three times on the front panel or on the remote control to select PC mode.
4. Turn the PC power on.
5. After the PC has completed booting, use the cursor buttons on the TV front panel or on the remote control to move the mouse cursor up/down/left/ or right to make selections. Use the channel down, channel up, C.S., and LST-CH buttons to perform other mouse functions.

3.2 PC AUDIO INPUT OPERATION

1. Connect the audio output of the PC to the PC Audio Input on the TV/PC monitor as shown below.

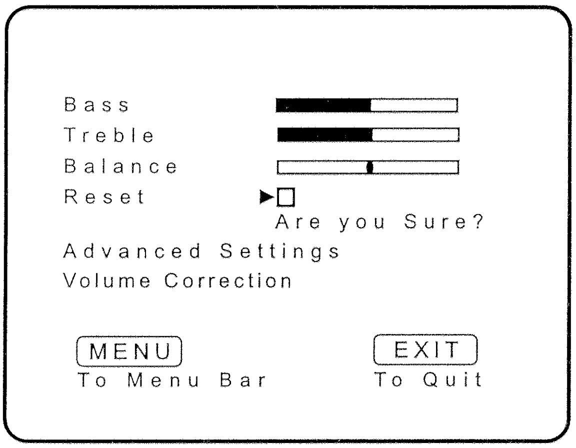


2. Turn the TV/PC monitor power on.
3. Press the input button three times on the front panel or on the remote control to select PC mode.
4. Turn the PC power on.
5. Press volume up (∧) or down (∨) to increase or decrease the sound level.
6. Press the menu button on the TV/PC monitor front panel or on the remote control to display the PC on-screen display.
7. Press the right (▶)or left (◀)cursor buttons to select the audio ♪ menu

8 Press the up(▲) or down (▼)cursor buttons to access the audio adjustment functions.

4. PC ON-SCREEN DISPLAYS

4.1 PC AUDIO OPERATION


Bass
Treble
Balance
Reset ▶☐
Are you Sure?
Advanced Settings
Volume Correction
MENU
To Menu Bar
EXIT
To Quit

Use the CURSOR ▲ or ▼ to highlight the function to be adjusted.

Press CURSOR ◀ or ▶ to adjust the function.

Press EXIT to quit menu or CURSOR ◀ to return to previous menu.

BASS
This function controls the low frequency audio to all speakers.

TREBLE
This function controls the high frequency audio to all speakers.

BALANCE
This function will control the left to right balance of the TV internal speakers and the AUDIO TO HI FI output.

RESET
When RESET is selected, the "ARE YOU SURE?" display will appear on the screen to confirm your choice. Press CURSOR ▶ to return AUDIO adjustments to factory preset conditions.

ADVANCED SETTINGS
See page 40 for details.

VOLUME CORRECTION
See page 41 for details.

NOTE: These audio settings are common to both TV and PC modes.
Changing settings in either mode affects the other

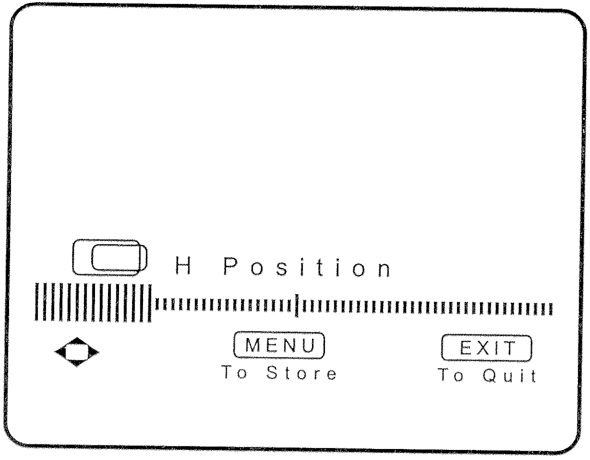
4.2 PICTURE ADJUSTMENTS

The following adjustments are independent of the TV mode:

- Press MENU in PC mode for on-screen display.
- Press CURSORS right (▶) or (◀) left to highlight the item to be adjusted.
- Press CURSORS up (▲) or down (▼) to select the highlighted item.
- Use CURSORS right (▶) or (◀) left to adjust.

H POSITION

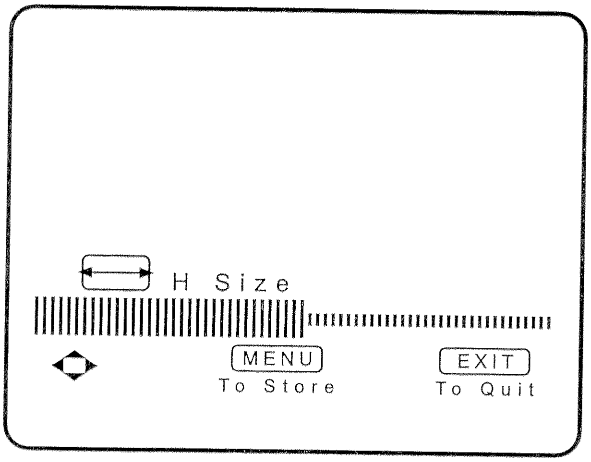
This feature allows you to adjust the horizontal position of the display.



Use Left/Right cursors to adjust the horizontal position. Press the MENU button to store and EXIT to quit.

H SIZE

This feature allows you to adjust the horizontal size in PC mode.

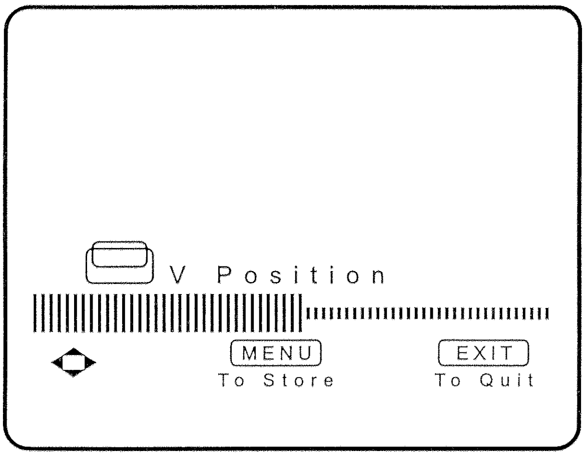


Use Left/Right cursors to adjust the horizontal size. Press MENU button to store and EXIT to quit.

PC ON-SCREEN DISPLAYS

V POSITION

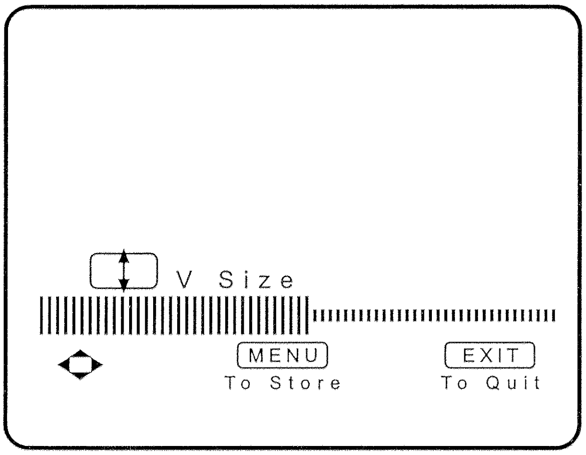
This feature allows you to adjust the vertical position in PC Mode.


V Position
MENU
To Store
EXIT
To Quit

Use Left/Right cursors to adjust the vertical position.
Press MENU button to store and EXIT to quit.

V SIZE

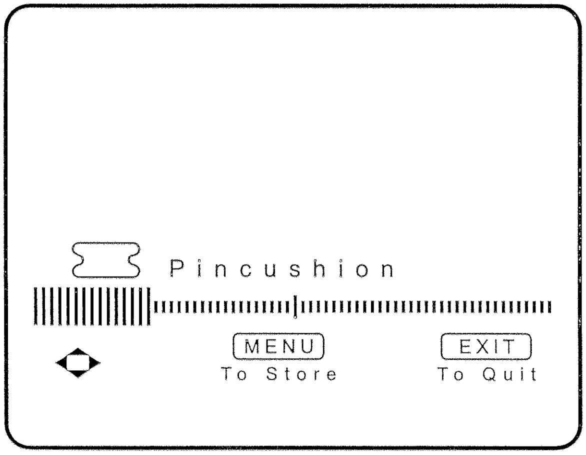
This feature allows you to adjust the vertical size in PC mode.


V Size
MENU
To Store
EXIT
To Quit

Use Left/Right cursors to adjust the vertical size.
Press MENU button to store and EXIT to quit.

PINCUSHION

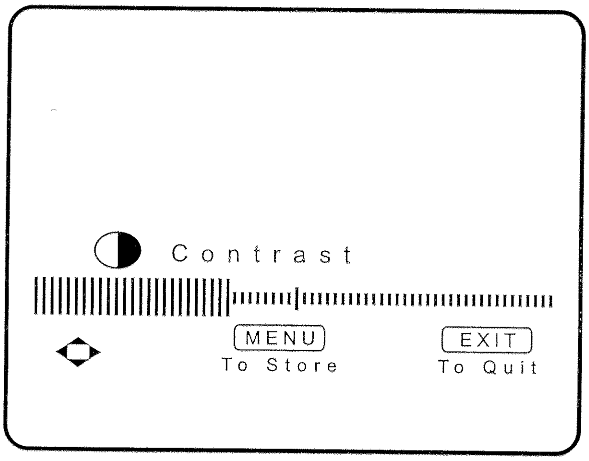
This feature allows you to adjust the left and right sides (pincushion) in PC Mode.


Pincushion
MENU
To Store
EXIT
To Quit

Use Left/Right cursors to adjust pincushion.
Press the MENU button to store and EXIT to quit.

CONTRAST

This feature allows you to adjust the contrast in PC mode.

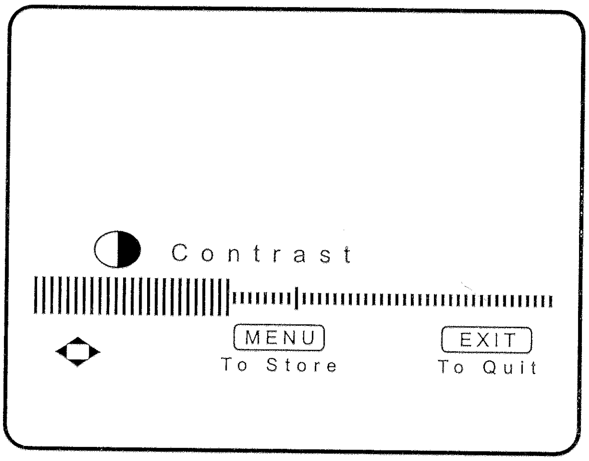

Contrast
MENU
To Store
EXIT
To Quit

Use Left/Right cursors to adjust contrast.
Press MENU button to store and EXIT to quit.

NOTE: See TV contrast feature for additional information regarding contrast.

BRIGHTNESS

This feature allows you to adjust brightness in PC Mode.


Contrast
MENU
To Store
EXIT
To Quit

Use Left/Right cursors to adjust brightness.
Press MENU button to store and EXIT to quit.

Chassis Adjustments

1. Adjustment Codes.

Table-1
TV Adjustment Codes

TV/PC MODE	Adj Code	Function	Range
TV Mode	A01	Stereo VCO	
	A02	SAP VCO	
	A03	Filter	
	A04	Input Level	
	A05	Separation (L)	
	A06	Separation (H)	
	P01	PIF VCO	
	P02	RF AGC	
	P03	R Cut off	
	P04	G Cut off	
	P05	B Cut off	
	P06	G Gain	
	P07	B Gain	
	P08	Sub. Bright	
	P09	Sub. Color	
	P10	Sub. Tint	
	P11	Sub. Sharpness	
	D01	V size	
	D02	V Liniality	
	D03	V S-correction	
	D04	V correction	
	D05	H-size	
	D06	Pincushion correction	
	D07	Corner Distortion	
	D08	Trapezoid distortion	
	D09	H correction	
	D10	V∫-correction	
	D12	H-center	
	D16	V-center	

Table-2
PC Adjustment Codes

TV/PC MODE	Adj Code	Function	Range
PC Mode	P12	R Gain	
	P13	G Gain	
	P14	B Gain	
	P15	Sub Bright	
	D02	V-Liniality	
	D03	V-S-correction	
	D04	V-correction	
	D06	Pincushion correction	
	D07	Corner correction	
	D08	Trapezoid distortion	
	D09	H-correction	
	D10	V∫-correction	
	D12	V-center	
	D13	H-center	
	D14	V-size	
	D15	H-size	
	D17	Mouse speed	

1.1. How to access the adjustment codes.

(1) Turn the TV power off.

(2) Using the front panel controls, press and hold the "INPUT" button while pressing the "Power" button to turn the TV on.
Keep the "INPUT" button pressed until the put I^2C codes appears in the bottom left corner of the screen.
Release the "INPUT" button.

AOO
OOO

TV MODE

POO
OOO

PC MODE

(3) Use the cursor buttons on the front control panel or on the remote control to perform adjustments.

(1) Press the UP or DOWN cursor to select the adjustment code.
(2) Press the LEFT or RIGHT cursor to change the data.
(3) Press the POWER button to store the data.

2. Adjustment Procedures

2.1 Adjustment of u-con clock.

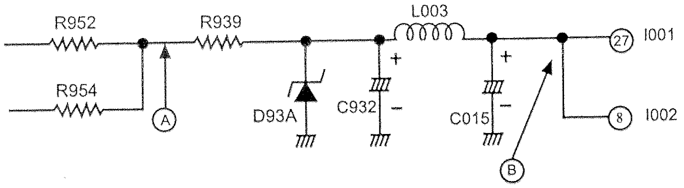


FIG. 1

(1) This adjustment should be done at power on mode.
(2) Confirm +15V (A) point.
(3) Connect frequency counter to I001 (12).
(4) Short I001 (9) pin with GND.
(5) Adjust C00T so that the clock frequency of I001 pin (12) is 125KHz±2Hz

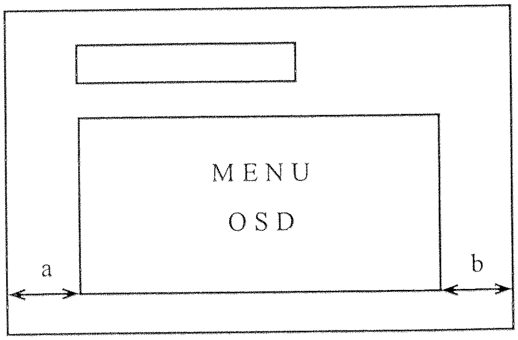
2.2 VCO for OSD adjustment.

Adjustment preparation

(1) Press menu button, and confirm menu OSD appears.

Adjustment procedure

(1) Adjust L001 so as to be equal between "a" and "b" as shown below.

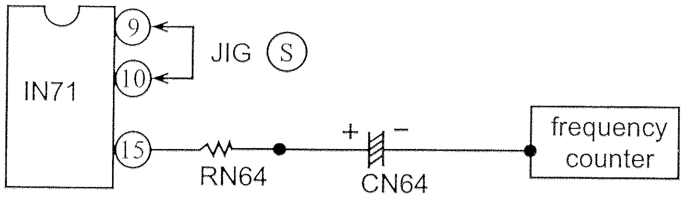


a = b

2.3 VCO for H. freq. of PC mode.

Adjustment preparation.

(1) Confirm +15V at point (A) (Fig. 1)
(2) Connect JIG (S) to IN71 (9) and (10) pin as follows.
(3) Connect frequency counter (F) as follows.


IN71
9
10
JIG Ⓢ
15
RN64
+ −
CN64
frequency counter

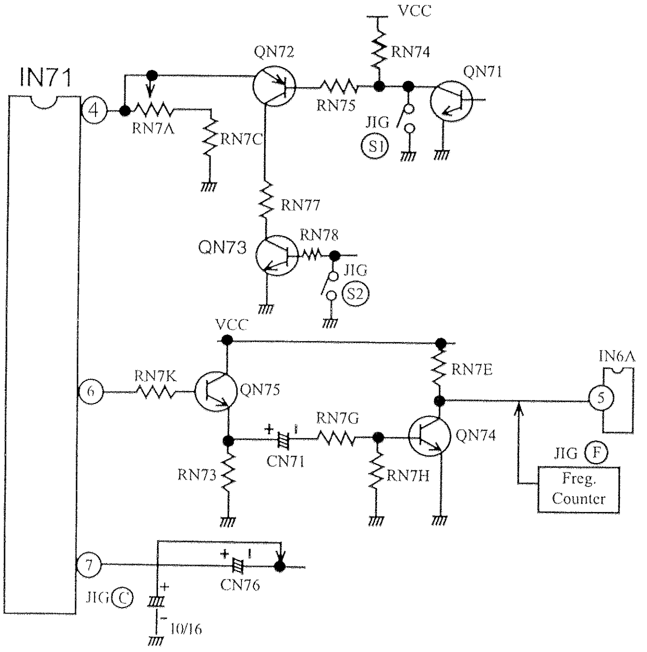
Adjustment procedure.

(1) Turn the RN87 so that the frequency counter indicates, 31.50kHz ± 100Hz
(2) Disconnect jig (S) and (F).

2.4 VCO for V. freq. of PC mode.

Adjustment preparation.

(1) Confirm +15V at point (A) (same as 2.1 (1))
(2) Connect jig (C) as follows: PA-1 CN76(-) PA-2 PS1A PIN #9
(3) Connect QN71 collector and QN73 Base to GND (jig (S1), (S2)) as follows. (PA-1)
Connect QN71 (B) and QN73 (B) to GND (jig (S1), (S2). As shown (PA-2).
(4) Connect frequency counter jig (F) to QN74 Collector as follows.


VCC
IN71
QN72
RN74
QN71
4
RN7A
RN7C
RN75
JIG
S1
RN77
QN73
RN78
JIG
S2
VCC
RN7K
6
QN75
RN7E
IN6A
5
RN7G
CN71
QN74
RN73
RN7H
JIG F
Freq. Counter
7
CN76
JIG C
10/16

PA-1 Only

(5) Connect Q782 Base to GND as follows.

Adjustment procedure.

(1) Turn the RN7A so that the frequency counter indicates, 55Hz ± 2Hz

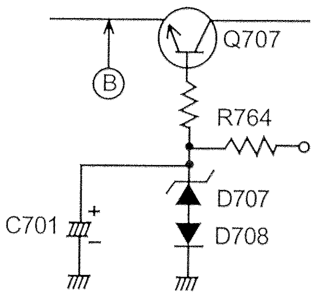
(2) Disconnect JIG (S1), (S2), (C), (F)

3. IF adjustment

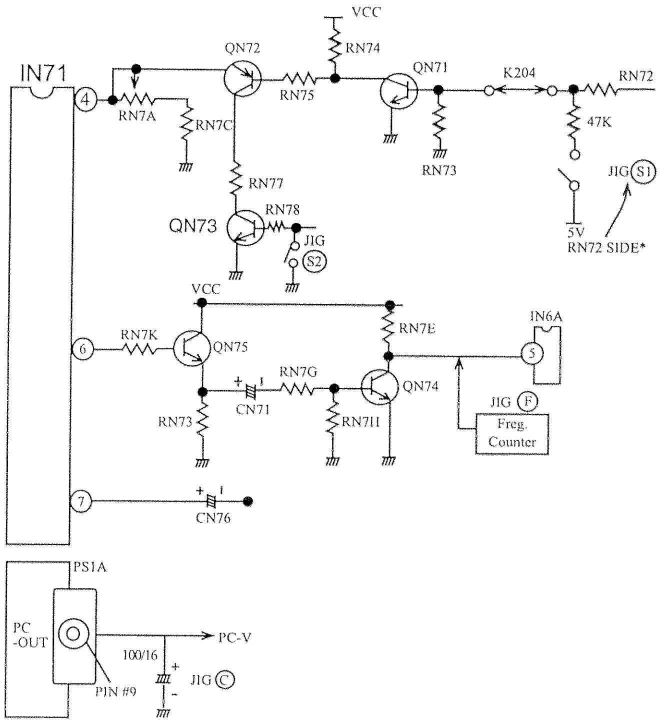
3.1. AFC adjustment

Adjustment preparation.

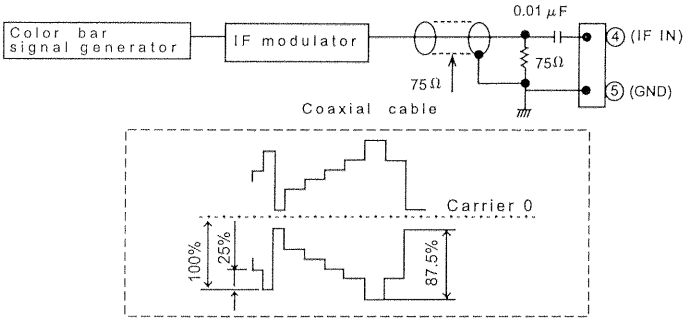
(1) Confirm 15V at point (A) (see fig. 1.)
(2) Confirm 12V at point (B) as shown below.


Q707
B
R764
D707
C701
D708

(3) Connect Q782 Base to GND (same as item 2.5 (5))
(4) Input signal between PIF1A (4) to PIF1A (5) as follows.


VCC
IN71
QN72
RN74
QN71
K204
RN72
4
RN7A
RN7C
RN75
47K
RN73
JIG S1
RN77
RN78
QN73
JIG
S2
5V
RN72 SIDE*
VCC
IN6A
RN7E
RN7K
6
QN75
5
RN7G
QN74
CN71
JIG F
RN73
RN7H
Freq. Counter
7
CN76
PS1A
PC -OUT
PC-V
100/16
JIG C
PIN #9

PA-2 Only


Color bar signal generator
IF modulator
0.01 μF
④ (IF IN)
75Ω
75Ω
⑤ (GND)
Coaxial cable
Carrier 0
100%
25%
87.5%

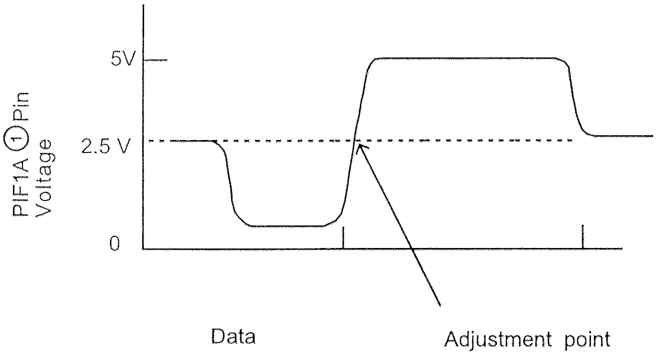
(5) Connect DC voltmeter (Input Impedance 1M ohm or more)

Adjustment preparation.

(1) Adjust the PIF data "P01" so that the voltmeter is 2.5±0.5V.
Adjustment point is the point at which the voltage changes suddenly with only "1" step in data changes.

(2) The adjustment data should be written in EEPROM

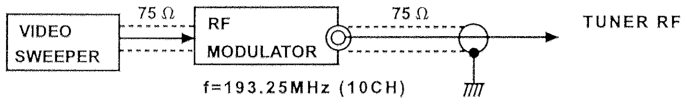
PIF1A ① Pin performance



3.2 Adjustment of IF waveform

Adjustment preparation

(a) Connect signal as follows.

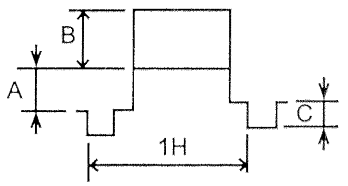

VIDEO SWEEPER
75 Ω
RF MODULATOR
75 Ω
TUNER RF
f=193.25MHz (10CH)

Markers

0.2 MHz
1 MHz
2 MHz
3.6 MHz

Out put level : 91±3 dBu (50ohm load)
Modulation : 90~70%

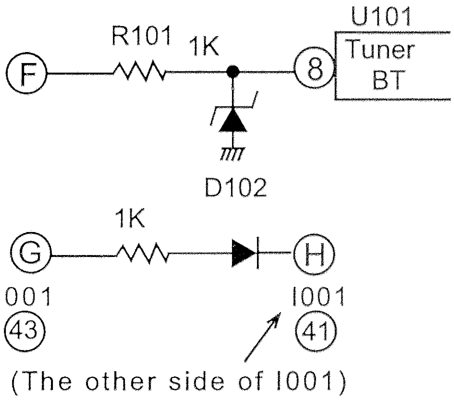
(b) Connect oscilloscope to PIF2A (5) Pin. (TP-12)
Check the signal at TP-12 as follows.



A : Set up level
B : Sweep signal level
C : Sync. level

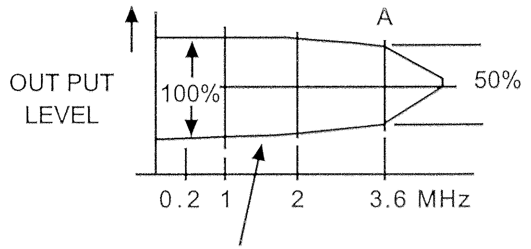
(c) Set-up as following:

(1) Follow steps (3.1.1 (1) ~ (4)).
(2) Confirm tuner BT (F) POINT : 42V
(3) Connect a1Kohm L resistor and diode (1S2076 or 1SS270TA) to points (G) and (H)
(4) Receive color bar signal


R101 1K
U101
Tuner BT
Ⓕ
⑧
D102
1K
Ⓖ
Ⓗ
I001 (43)
I001 (41)
(The other side of I001)

Adjustment procedure

(a) Adjust tuner IFT coil so that the output level of 0.2MHz is reference level (100%) and 3.6MHz level is 60% (At this time, do not turn tuner IFT coil more than 1 turn.)



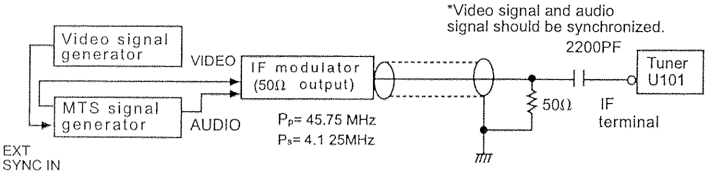
Check that 1MHz~2MHz level is 70%~100%.

4. MTS demodulating circuit adjustment.

4.1 Input level adjustment (Adjustment code A04)

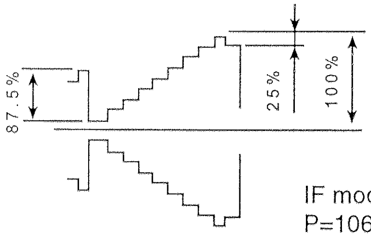
Adjustment preparation

(1) Apply the signal to tuner (U101) IF output terminals of MAIN PWB using the jig shown below.



*Video signal and audio signal should be synchronized.
Video signal generator
VIDEO
IF modulator (50Ω output)
MTS signal generator
AUDIO
P_P= 45.75 MHz
P_S= 4.1 25MHz
EXT SYNC IN
2200PF
50Ω
IF terminal
Tuner U101

IF modulator output signal waveform
(Color bar or all white)



IF modulator output level and P/S
P=106dBu (50 ohm termination)
S level ; -3dB to P level
S/N ratio of F/Evideo output is 45dB or less.

Sound modulation condition

- Noise reduction encoder;ON
- Stereo signal;
  (1) R=0 (L only), 300Hz, 30% modulation
  (2) R=0 (L only), 3KHz, 30% modulation

- Monoaural signal ;
  (3) monoaural, 400 Hz 100% modulation
  (PREEN OFF)
- SAPsignal ;
  (4) SAP, 300HZ 30% modulation

(2) Connect AC voltmeter to I402 pin (26). (TP-PVCO)
- Use the AC voltmeter model VPS950C made by Matsushita.

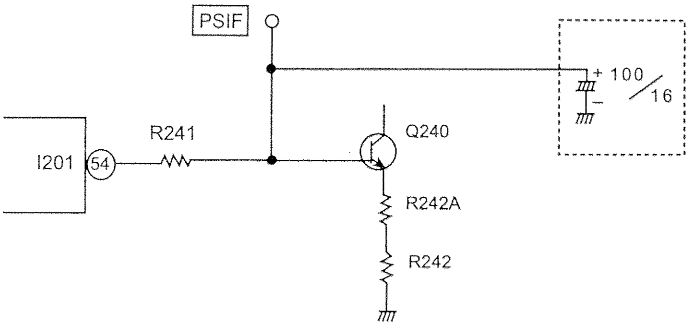
Adjustment procedure

(1) Select sound input signal (3) and adjust the data (A04) to Vo=signal 500±10Vrms.
(2) Write the data into EEPROM I002

4.2 Stereo VCO adjustment (Adjustment code A01)

Adjustment preparation

(1) Set-up is same as item 3.1.2.
(2) Connect a frequency counter to I402 pin (26). (TP-PVCO)
Use a probe ratio of 1:1. (Ri≥1M ohm, Ci<15pF)
(3) No signal at I402 pin (7) input (PFIL).
(4) Connect capacitor (100uF/16) as follows.
(5) Select adjustment code A01



PSIF
+ 100/16
I201
54
R241
Q240
R242A
R242

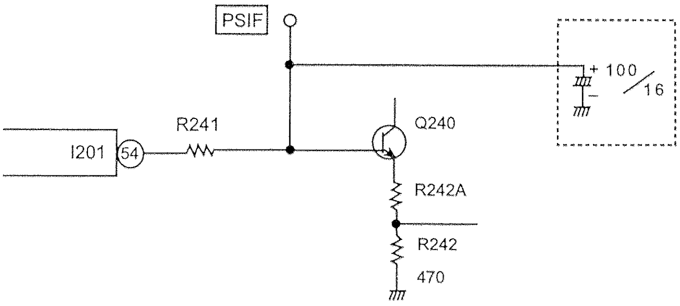
Adjustment procedure

(1) Adjust the data to set 15.734±0. 1KHz.
(2) Write the data into EEPROM (I002).
(3) Remove capacitor (100uF/16).

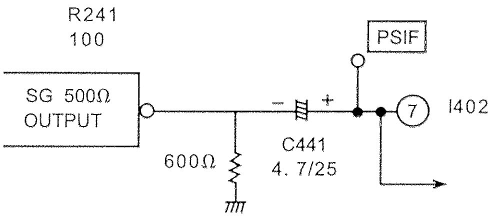
4.3 Filter adjustment (Adjustment code A03).

Adjustment preparation

(1) Connect a capacitor 100uF/16V as shown below.
(2) Apply the signal to I402 pin (7) with the jig as shown below.



PSIF
+ 100/16
R241
Q240
I201
54
R242A
R242
470



R241
100
PSIF
SG 500Ω OUTPUT
− +
7
I402
C441
4. 7/25
600Ω

SG output signal spec.
(1) FREQUENCY, f=15.734KHZ(sin wave)
f=15. 734KHz (sin wave)
(2) Signal level, V=100mVrms.
V=100mVrms

(3) Connect an AC voltmeter or oscilloscope to I402 pin (26) (TP-PVCO).
(4) Select adjustment code "A03"

Adjustment procedure

(1) Adjust the data so that the voltage of I402 (26) ([PVCO]) pin is minimum.
(2) Write the data into EEPROM (I002).

4.4 Separation adjustment (Adjustment code A05/A06") (This adjustment should be done only after adjustment of items 3.2.)

Adjustment preparation

(1) Set-up same as 3.2.1 (1).
(2) Connect an AC voltmeter (or connect an oscilloscope.) to I402 pin (26) (TP-PVCO).

Adjustment procedure

(1) (L separation adjustment)
Select sound input signal (1) and adjust the data of "A05" so that 300Hz level is min..
(2) (H separation adjustment)
Select sound input signal (2) and adjust the data of "A06" so that 3KHz level is min.
(3) Repeat (1) and (2) so the adjustment accuracy is within+1dB from min. point.
(4) Write the data into EEPROM (I002).

4.5 SAP VCO adjustment (adjustment code "A02")

Adjustment preparation

(1) Connect an frequency counter to I402 (26) (TP-PVCO).
(2) Set-up same as item.

Adjustment procedure

(1) Adjust the data of "A03" so that the frequency is 78.67±0.5KHz.
(2) Write the data into EEPROM (I002).

5. Cut off adjustment(TV mode)

Adjustment preparation

(1) Connect an oscilloscope to R.G.B. output. (see Table 1)
(2) Receive CROSS-HATCH pattern signal.

	PIF1A
R output	⑪ pin
G output	⑫ pin
B output	⑬ pin

Table 1

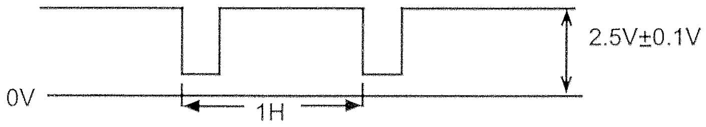
Adjustment procedure

(1) Select red cut-off adjustment code "P03".
(2) Adjust the cut-off data as that the output waveform is 2.5.±0.1V.
(3) Write the data to EEPROM (I002).
(4) Perform the same procedure for G and B.(see Table 2 for adjustment codes.)

Adjustment Code

Data	Sub address
R cut off	P03
G cut off	P04
B cut off	P05

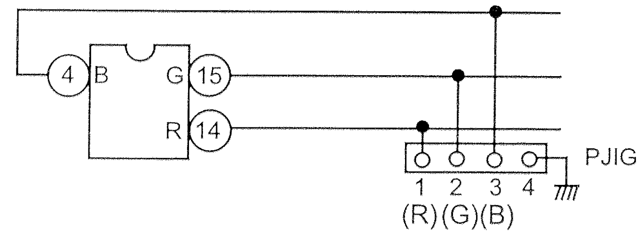
Table 2

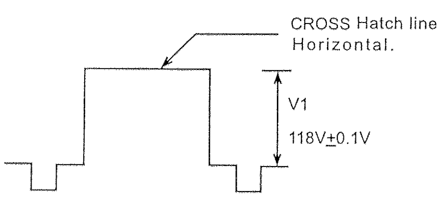


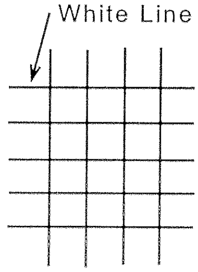
6. PC mode. RGB Gain Adjustment.

Adjustment preparation/procedure

(1) Connect an oscilloscope to PJIG connector pin (1) on the CPT PWB. (Red).


4
B
G
15
R
14
PJIG
1 2 3 4
(R)(G)(B)


CROSS Hatch line Horizontal.
V1
118V±0.1V



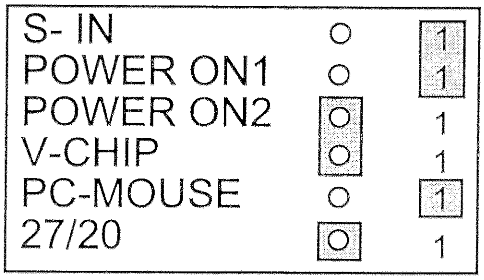
Data	Codes
PC R-Gain	P 1 2
PC G-Gain	P 1 3
PC B-Gain	P 1 4

Table 3: PC R/G/B Gain Adjustment Codes

(2) Connect PC "VGA" output to the "VGA" input at the rear of the TV set.
(3) Select PC mode.
(4) Receive a Cross-Hatch Signal.
(5) In PC mode, set the contrast to max.
(6) Adjust "P12" data so that V1=1.8V±0.1V.
(7) Write the data to the EEPROM (I002).
(8) Perform the same procedure to adjust G and B Gain. (See Table 3 for the codes).

7. Initial setting and operation checking.

7.1 Initial setting.

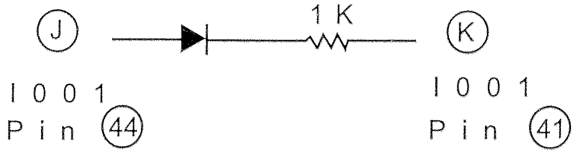


S- IN	○	1
POWER ON1	○	1
POWER ON2	○	1
V-CHIP	○	1
PC-MOUSE	○	1
27/20	○	1

OSD TABLE

Checking procedure

(1) Connect diode (1SS270TA or 1S2076) to (J) ~ (K)

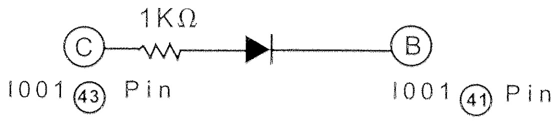

J
1 K
K
I 0 0 1
P i n 44
I 0 0 1
P i n 41

(2) Confirm OSD settings (shown in the above) to appear.
(3) Remove diode. After this operation, each setting should be initialized seting automatically.
(4) Check if beep is heard after initializing.

7.2 Clock operation check

Checking preparation

(1) Connect a Diode (IS2076 or ISS270TA) and a 1Kohm JIG. between points (C) and (B).

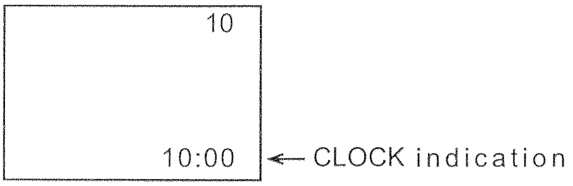

1KΩ
C
B
I001 43 Pin
I001 41 Pin

Remark: This diode changes clock 60 times quicker than normal.

(2) Select CLOCK SET from the OSD and set the clock to eg. 10:00.

Checking procedure

(1) After clock setting is finished exit the OSD.
(2) Press recall to display the clock.
(3) Check that the minutes changes every second.



(4) Remove JIG.

7.3 AFC operating check

Checking preparation

(1) Connect the jig shown below to the ANT terminal.

Checking procedure

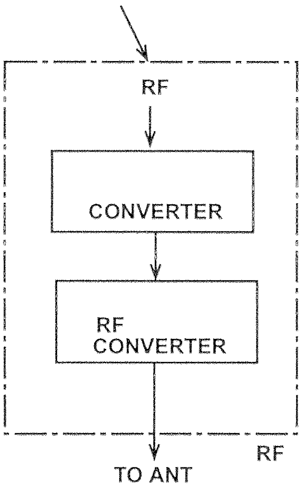
(1) Receive a standard carrier (not offset) with channel up/down or direct selection buttons. Check that is pulled into the standard tuning point.

(2) Receive an offset signal of +1.5MHZ.
Check that it is pulled into the standard tuning point.
(Perform the channel selection operation again.)

(3) Receive an offset signal of -1.5MHZ.
Check that it is pulled into the standard tuning point.
(Perform the channel selection operation again.)

(note 1) Modulation signal, circle pattern or a color bar signal, can be used.

(note 2) Checking Jig (All channel converter can be used)



8. PC mode deflection circuit adjustment.

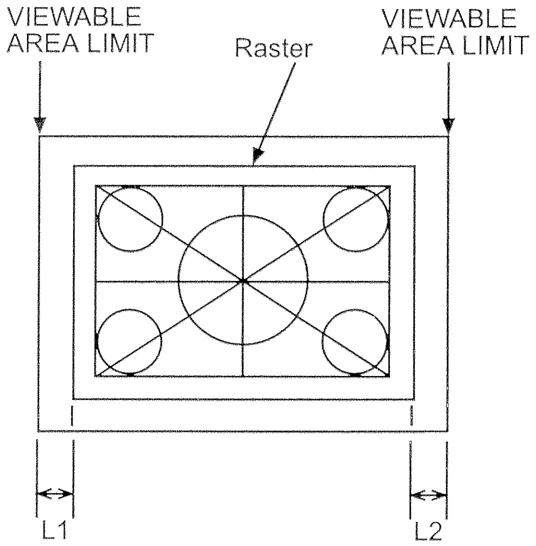
8.1 Raster center adjustment.

Adjustment preparation

(1) Receive CROSS HATCH with CIRCLE pattern from a PC.

Adjustment procedure

(1) Adjust R791 so that L1 and L2 are even.



(2) Increase the PC-OSD Brightness control so the raster edge is visible.

8.2 H&V position coarse adjustment.

Adjustment preparation

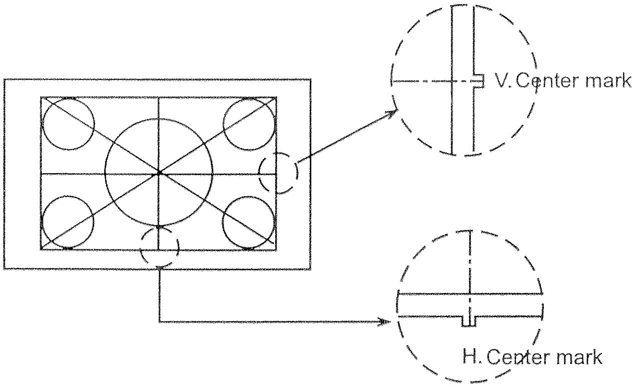
(1) Receive CROSS HATCH with CIRCLE pattern from a PC. In PC mode and set CONTRAST MAX. and others center.
(2) The set should be face the north or south.
(3) Select adjustment code "D12"-V. center.

Adjustment procedure

(1) Adjust vertical center by changing data as the figure below

(2) Select adjustment code "D13".

(3) Adjust horizontal center as shown in the fig. below.



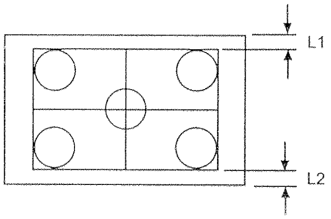
8.3 Vertical size adjustment.

Adjustment preparation

(1) Receive CROSS HATCH and CIRCLE pattern from a PC. In PC mode set CONTRAST MAX. and others center.
(2) The set should be face the north or south.
(3) Select adjustment code "D14".

Adjustment procedure

(1) Adjust vertical size as the figure below, by changing data.



	(Unit ;mm)
Set name	L1, L2
27MM20B	15±5mm

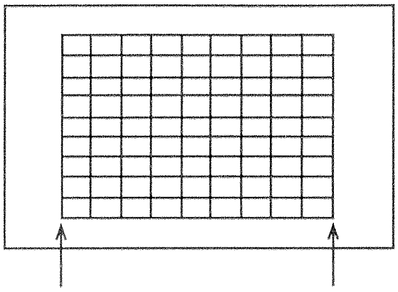
8.4 Pin cushion distortion adjustment.

Adjustment preparation

(1) Receive CROSS HATCH with CIRCLE pattern from A PC. In PC mode set CONTRAST max. and others center.
(2) The set should be face the north or south.
(3) Select adjustment code "D06".

Adjustment procedure

(1) Adjust pincushion distortion as the figure below, by changing data.



Left and right side are straight

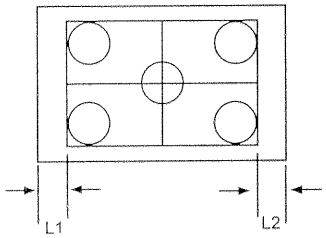
8.5 Horizontal size adjustment.

Adjustment preparation

(1) Receive CROSS HATCH with CIRCLE pattern from A PC. In PC mode set CONTRAST max. and others center.
(2) The set should be face the north or south.
(3) Select adjustment code "D15".

Adjustment procedure

(1) Adjust Horizontal size as the figure below, by changing data.



	(Unit ;mm)
Set name	L1, L2
27MM20B	20±5mm

8.6 Corner and Trapezoid distortion adjustment.

Adjustment preparation

(1) Receive CROSS HATCH pattern from a PC. In PC mode set CONTRAST max. and others center.

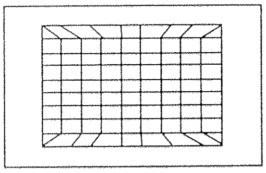
(2) The set should be face the north or south.

Adjustment procedure

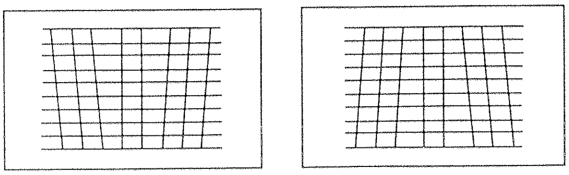
(1) Adjust these distortion like the figure below, by changing data.

Adjustment codes
Corner Distortion “D07”
Trapezoid Distortion “D08”

CORNER DISTORTION



TRAPEZOID DISTORTION



8.7 70Hz mode adjustment.

Adjustment preparation

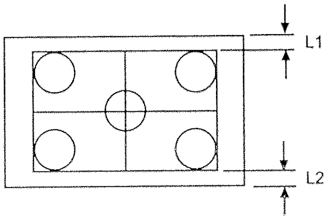
(1) Receive CROSS HATCH with CIRCLE pattern from a PC. In PC mode and set CONTRAST MAX. and others center.

(2) The set should be face the north or south.

Adjustment procedure

(1) Adjust vertical center and size as the figure ADJUSTMENT CODE by changing data.

V center “D12”
V size “D14”



	(Unit ;mm)
Set name	L1, L2
27MM20B	15±5mm

9. TV mode deflection circuit picture adjustment.

9.1 H-center adjustment.

Adjustment preparation

(1) Apply heat-run 30 min. or more after the power is turned on.
(2) Receive circle pattern signal with left and right side markers.
(3) Set CONTRAST max. and others center.
(4) Select adjustment code "D12".

Adjustment procedure

(1) Adjust horizontal center so that deference of right and left size marker is with in 0.5, pitch.

9.2 Vertical center and size adjustment.

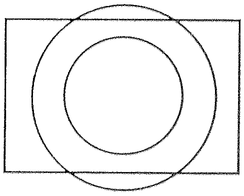
Adjustment preparation

(1) Apply heat-run 5 min. or more after the power is turned on.
(2) Receive circle pattern signal, and set CONTRAST max. and others center.
(3) The set should be face the north or south.

Adjustment procedure

(1) Adjust vertical center and size so that the outer circle pattern is like the figure below, by changing data.
Adjustment code

V center "D16"
V size "D01"



1/2 of the width of outer circle comes to the screen.

9.3 Pincushion distortion adjustment.

Adjustment preparation

(1) Receive CROSS HATCH signal and set CONTRAST to max. and BRIGHT to the point where the background is set.
(2) Select adjustment code "D06".

Adjustment procedure

(1) Adjust side pincushion distortion so that the line of the right and left is straight by changing data.

9.4 Horizontal size adjustment.

Adjustment preparation

(1) Receive circle pattern signal with right and left side markers.
(2) Set CONTRAST to max. and BRIGHT to center.
(3) Select adjustment code "D05".

Adjustment procedure

(1) Adjust so horizontal size markers at the left and right sides to be within 1.5 pitch.

9.5 Corner and Trapezoid adjustment.

Adjustment preparation

(1) Receive CROSSHATCH signal and set CONTRAST to max. and BRIGHT to the point where the back ground is set.

Adjustment procedure

(1) Adjust these distortion like the figure below, by changing data.

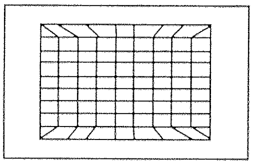
Corner Distortion "D07"

Custom code	1DH
Data code	00H~0FH
Data bit	D3~D0

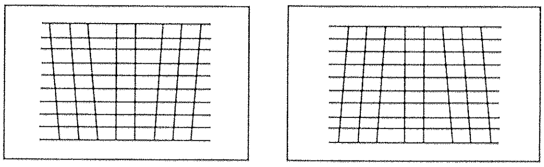
Trapezoid Distortion "D08"

Custom code	1EH
Data code	00H~3FH
Data bit	D5~D0

CORNER DISTORTION



TRAPEZOID DISTORTION



10. White balance adjustment

10.1 PC mode

Cut-off, High Light & Low Light Adjustment

Adjustment preparation

(1) Apply heat-run 20 min. before any adjustment
(2) Verify purity adjustment has been complete
(3) Set the user controls as follows:
Contrast =maximum
Bright =center
Sub-bright(P15)=95
(4) Turn low brightness white balance adjusting VRs (R866, R868, R870) fully counter-clockwise
(5) Turn VRs (R860, R8864) to their mechanical center
(6) Turn the Screen VR fully counter-clockwise
(7) Receive a black raster signal.

Adjustment procedure

(1) Activate the cut-off line (adjustment code P12 + Menu)
(2) Turn the screen VR clockwise and set to the position where the bright colored line start appearing on the CPT screen. Do not turn thereafter the low brightness white balance VR(A) corresponding to the color first appearing.
(3) Turn the low brightness white balance VRs (R866, R868, R870) and adjust so that red, green and blue bright colored lines appear on the screen equally.
(4) Turn the screen VR fully counter clockwise and then clockwise to the position where the line just appears.
(5) Return to the normal mode (press 'Menu')
(6) Set the user controls as follows:
Contrast =80% of its OSD range
Brightness = center
(7) Receive program a white raster signal
(8) Adjust VRs (R860, R864) so that the x & y coordinates of the Color Analyzer displays as:
x=0.284 y=0.296
(9) Set Contrast minimum
(10) Verify that the x & y coordinates of the Color Analyzer displays as:
x=0.284 y=0.296
(11) If not, adjust VRs (do not touch VR(A)) (R866, R868, R870 so that the x & y coordinates of the Color Analyzer displays as:
x=0.284 y=0.296
(12) Repeat step 6, step 8 and finish

10.2 Sub-Bright level adjustment (PC mode)

Adjustment preparation

(1) Apply heat-run at least 20 minutes before any adjustment
(2) Set the user controls as follows:
Contrast = maximum
Brightness = maximum
(3) Receive program a black raster signal.

Adjustment procedure

(1) Activate the sub-bright (adjustment code P15)
(2) Adjust sub-bright to 15 cd/m^2
(3) Return to the normal mode (press 'Power' to store)

10.3 TV mode

Cut-off, High Light & Low Light Adjustment

Adjustment preparation

CAUTION:
[THIS ADJUSTMENT SHOULD BE DONE AFTER ADJUSTMENT OF PC MODE WHITE BALANCE AND SUB-BRIGHT, AND NEVER TURN THE SCREEN VR.]

Adjustment preparation

(1) Apply heat-run at least 20 minutes before any adjustment.
(2) Verify that PC mode white balance adjustment is done.
(3) Set the user controls as follows.

Contrast = maximum
Brightness = center
Color = cool
Set P08 = 00

(4) Receive white raster signal.

Adjustment procedure

(1) Activate the Red cut-off line (adjustment code P03 + Menu)
(2) Adjust so that Red line just appears.
(3) Go to the Green cut-off line (adjustment code P04)
(4) Adjust so that Green line just appears.
(5) Go to the Blue cut-off line (adjustment code P05)
(6) Adjust so that Blue line just appears.
(7) Return to the normal mode (press 'Menu' and then 'Power')
(8) Receive white raster signal
(9) Set the user controls as follows:
Contrast = 80% of its OSD range
Brightness = center
(10) Adjust the Green drive (adjustment code P06) and the Blue drive (adjustment code P07) so that the x & y coordinates of the Color Analyzer displays as:
x=0.284 y=0.296
(11) Return to normal mode (press 'Power')
(12) Set Contrast minimum
(13) Verify that the x & y coordinates of the Color Analyzer displays as:
x=0.284 y=0.296
(14) If not, adjust service code P03, P05 so that the x & y coordinates of the Color Analyzer displays as:
x=0.284 y=0.296
(15) Repeat step 9 to step 11 and finish

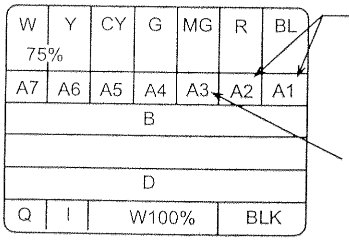
10.4 Sub-Bright level adjustment (TV mode)

Adjustment preparation

(1) Apply heat-run 20 min. or more after the power is turned on.
(2) Receive a color bar signal.
(3) Set CONTRAST and color controls to min.
(4) Set the vertical incident illumination on the CPT surface to 20 lux or less.
(5) Set BRIGHT control to the center position.
(6) Set white control to COOL.
(7) Select adjustment code P08.

Adjustment procedure

(1) Adjust the background of A1, A2 are set to black and A3 is set lighter black by SUB-BRIGHT DATA .



The background is set to black perform the adjustment without observing the boundary parts.

The background is set to lighter black.

(2) Check by directly observing the CPT surface, without using a mirror.

11. AGC adjustment.

Adjustment preparation

(1) After all the adjustment are finished, heat-run 5 minutes or more with a color bar signal.
(2) Set PICTURE to Max. and BLACK LEVEL to center.
(3) Antenna input level;-51dBm
(4) Connect DC voltmeter (impedence 1Mohm or more) to PAGC pin.
(5) Select adjustment code "P02"

Adjustment procedure

(1) Adjustment AGC data until the indication of DC volt meter does not change any more at the maimum point. the reading of DC voltmeter is named V1. Adjust AGC data so that the indication of DC voltmeter is {V1-(0.5+0.2)}V.

12. Setting for delivery

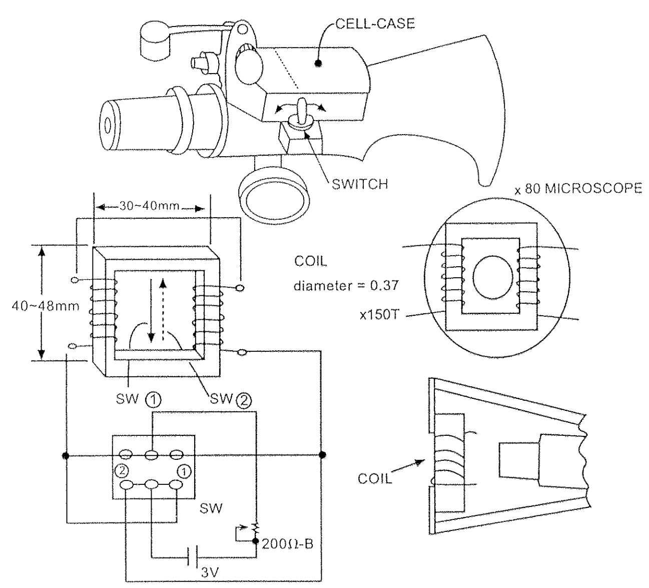
Name	27MM20B
SIGNAL SOURCE	Antenna
RECEPTION CHANNEL	03 CH
SOUND VOLUME (VOLUME)	"10" On-screen display
INPUT SELECT	TV mode
CONTRAST	Max.
COLOR	Center
TINT	Center
BRIGHT	
SHARPNESS	Center
COLOR TEMP.	Cool
BALANCE	Center
BASS	Center
TREBLE	Center
MTS MODE	Stereo
LOUDNESS	Off
VOLUME CORRECTION	No setting
AUTO NOISE CANCEL	Off
INT.SP	On
CLOSED CAPTION	Off
CLOSED CAPTION MODE	C.C
CLOSED CAPTION CHANNEL	1
MENU language	English
CHANNEL ID	No setting
FAMILY Favorites	No setting
CHILD Lock	No setting
CLOCK Set	No setting
CHANNEL Memory	03~13CH
ON/OFF Timer	No setting
Message	No setting
H Position (PC)	Center
H size (PC)	Center
V Size (PC)	Center
V Position (PC)	Center
Contrast (PC)	48 step
Brightness (PC)	Center

13. PURITY/ CONVERGENCE ADJUSTMENT

13.1 Adjustment Preparation

(1) Keep DY sticked to CPT funnel.
(2) Turn ON the set and receive cross-hatch signal (or circle pattern signal). Adjust the static convergence coarsely according to item (VIII, 1-4).
(3) Receive circle pattern signal and adjust the white balance according to item 4-11.
(4) Set BRIGHTNESS control and CONTRAST control to maximum and apply heat-run to the with circle pattern signal received for 40 min or more.

Reference


CELL-CASE
SWITCH
x 80 MICROSCOPE
30~40mm
40~48mm
COIL
diameter = 0.37
x150T
SW ①
SW②
②
①
SW
200Ω-B
3V
COIL

Fix coil to CRT side of microscope. Set it upside down and measure it. Check that beam moves to the right and left equally in quantity. Be careful at assembly that core does tilt because upwaward (downward) magnetic field by coil moves the beam to the right (left) or type MS-50X microscope of KANSAI DENKI.

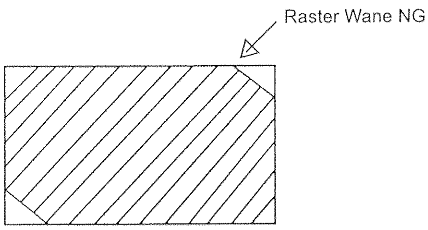

Raster Wane NG

TABLE 1

CPT	T
A68KSA30X(D)	40 Min.

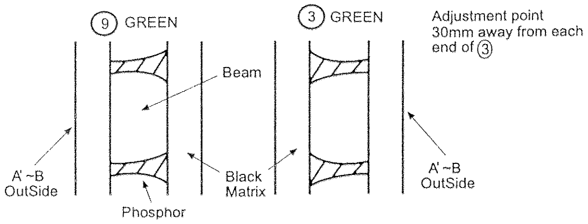
The magnetic field in artificial magnetic field should follow the table below and the set should face as in Table 2. Degauss it from outside.

DESTINATION	VERTICAL FIELD	HORIZONTAL FIELD
USA	0.45 G	0.3 G
CANADA	0.54 G	0.15 G
UNIVERSAL	0.35G	0.3 G
PANAMA, HAWAII	0.2 G	0.3 G

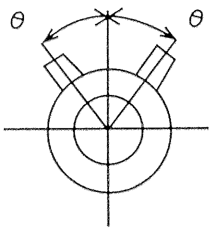
13.2 Preparation

THIS ADJUSTMENT METHOD APPLIES TO THE PURITY ADJUSTMENT BY USING MICROSCOPE.

(1) Adjust coarsely White balance, Static convergence (center) and Focus.
(2) Receive circle pattern and heat-run more than T minutes with CONTRAST and BRIGHTNESS to maximum. Do not delete the raster nor vary the current before fixing the position of DY. Heat-run should be done with perfect raster. (DY and tilt should have been coarsely adjusted.)
(3) Set microscope with wobbler coil to CRT face. Check that the beams moves to right and left equally.
NOTES:
(a) Open the purity magnet as follows in order to move the raster only in the right-left direction to center the picture white keeping the landing at (3) and (9) positions.
(4) Adjust the purity magnet and DY to obtain the landing at (3) and (9) as below.

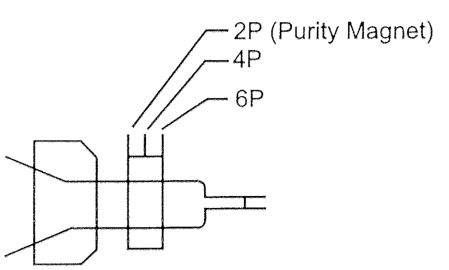

⑨ GREEN
③ GREEN
Adjustment point 30mm away from each end of ③
Beam
A'~B OutSide
Black Matrix
Phosphor
A'~B OutSide

(a) Open the purity magnet as follows in order to move the raster only in the right-left direction.

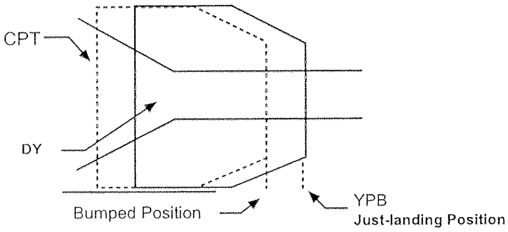


C-F MAGNET

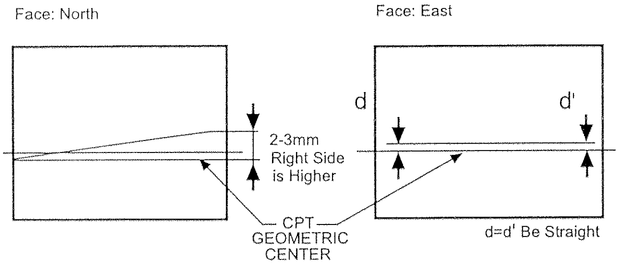
Keep the balance of ③/⑨ DY landing



(b) YPB (Yoke pull-back) should be as follows, (Distance between the bumped position of DY toward the funnel and the just-landing position of ③ and ⑨.)



(C) DY tilt should be as follows.



(5) Fix DY with fixing torque of 14g.cm.

(6) If any miss landing occurs, correct with magnets. If mislanding is 10u or so, judge by white unevenness. At this time, if the white unevenness is all right, magnet is not needed.

(7) After peripheral convergence is adjusted, check the position of DY and tighten the DY again. (14g.cm)

(8) Purity check
The magnetic field in artificial magnetic field should follow the magnetic field according to the destination, and the set should face as follows.
After degaussing in each direction, check these items visually and with a microscope.

(a) No problem in white unevenness.

(b) Each single color must not hit any other colors.

(c) If white or each single color is defective, apply a magnet(s) on CPT for correction.
If any magnet is applied, check it after degaussing.

13.3 Purity Adjustment (This adjustment method applies to purity adjustment by hand operation.)

(1) Use an artificial magnetic field and set the field strength as follows.
*Magnetic field in CPT axis direction: 0 Gauss
*Magnetic field which is vertical to CPT axis:
U.S.A., Hawaii, Panama, Guam
Bolivia, Peru, Universal........0.3 Gauss
Canada.........0.15 Gauss
Taiwan.................0.37 Gauss
(The direction of the magnetic field should be from the left side to the right side of the CPT screen as you face it.)

(2) Adjust Focus coarsely.

(3) Adjust Convergence coarsely according to item 1-4 and 1-5.

(4) Receive Circle Pattern signal and check that Contrast and Brightness are maximum.

(5) Receive magenta signal. When the magenta signal is not available, short-circuit between the base and emitter of Q855 and set to magenta.

(6) Press DY fully against CPT funnel and turn the purity magnet so that the vertical magenta band comes to the center of the picture (Fig. 1-3-1). Check that color unevenness of both sides are approximately equal at this time.The openings of the purity magnet should be symmetric (Fig. 1-3-2).

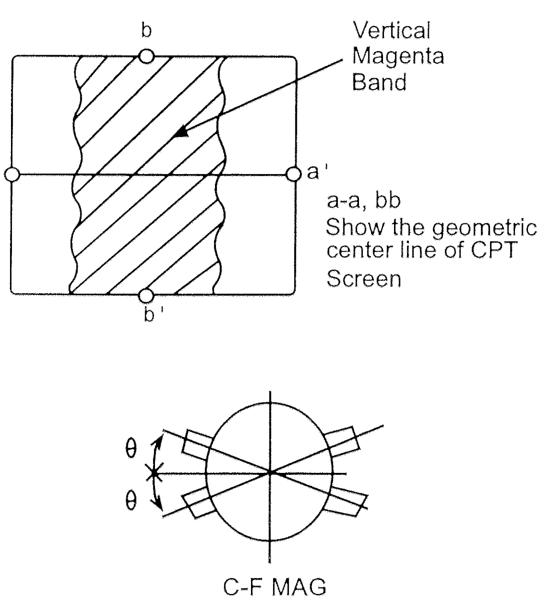

b
Vertical Magenta Band
a '
a-a, bb
Show the geometric center line of CPT Screen
b '
θ
θ
C-F MAG

FIGURE 1-3-2

(7) Receive the single red signal.
When the single red is not available, short-circuit between the base and emitter of Q845, and between the base and emitter of Q857 and set to single red.

(8) Pull back DY gradually and when the color uneven -ness of both sides of the picture disappear, mark the rear edge position of DY on the tape in the same way. At this time, pull back DY until color uneveness starts to appear. Also mark this position.

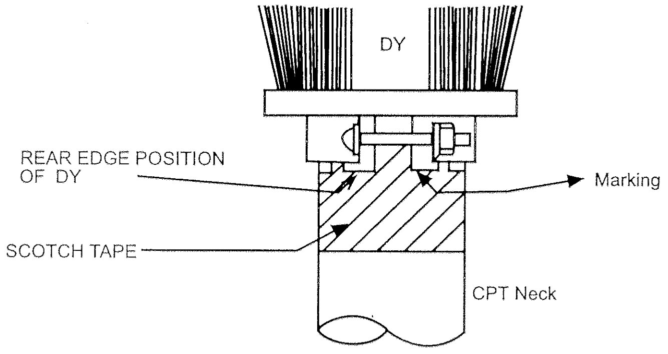
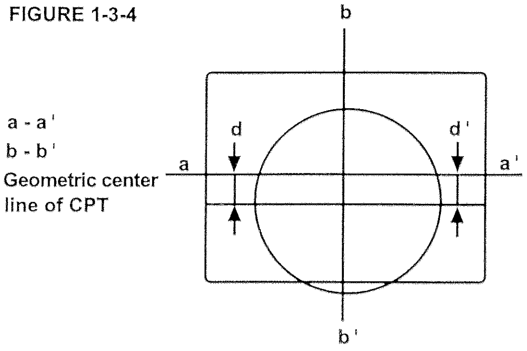

DY
REAR EDGE POSITION OF DY
Marking
SCOTCH TAPE
CPT Neck

FIGURE 1-3-3

(9) Move DY so that the rear edge position of DY comes to the center of the two marked lines and faten DY as d=d (Figure 1-3-4). Further insert the rubber wedge between DY and CPT funnel from the top and raise DY.

FIGURE 1-3-4


b
a - a '
b - b '
Geometric center line of CPT
a
d
d '
a '
b '

(10) Set CPT axis direction magnetic field of the artificial magnetic field setting list classified by destination. (The direction of the magnetic field should be from the CPT screen side to the neck side.)
After degaussing it from outside, check the purity in each color to R, G, and B visually.
Then, turn the screen to white and check the landing at the screen position shown in Fig. 1-3-5 with a microscope.

(11) Criteria with microscope
There should be no miss landing at positions 2, 4,8 and 10.
Green beam should be at center of the green phosphor at position C.

(12) Turn over the direction of CPT axis direction magnetic field of next artificial magnetic field and check it by the same way as item (11). The positions of miss landing criteria with a microscope should be 2, 4, 8 and 10 (Figure 1-3-5).

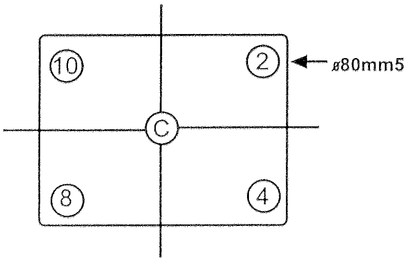
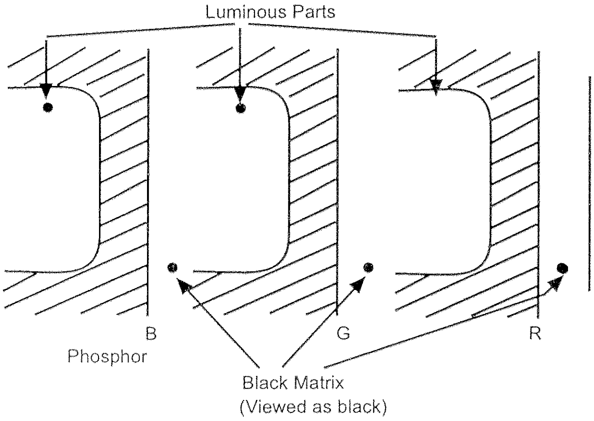

⑩
②
ø80mm5
Ⓒ
⑧
④

FIGURE 1-3-5

Miss landing crteria

The following conditions are defined as miss landing. Each color beams shines on the phosphor of the applied color, and there are phosphor parts which are not luminous (shaded parts in the figure below) between the luminous parts and black matrix.


Luminous Parts
B
G
R
Phosphor
Black Matrix
(Viewed as black)

(13) To improve the miss landing mentioned above, it's acceptable to stick the permanent magnet to CPT funnel (Figures 1-3-7 and 1-3-8).

Usage

Apply a silicon rubber KE-40 WRTV to the permanent magnet shown in the Figure, adhere it to the CPT funnel and then fix it with permacel tape P212.

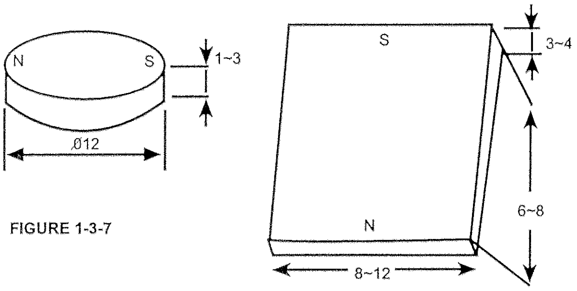
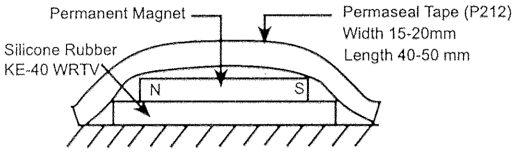

N
S
1~3
ø12
S
3~4
6~8
N
8~12

FIGURE 1-3-7


Permanent Magnet
Permaseal Tape (P212)
Width 15-20mm
Length 40-50 mm
Silicone Rubber
KE-40 WRTV
N
S

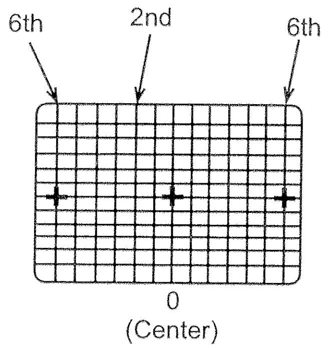
4 Permanent magnets are useable at most.

(14) Final purity criteria should satisfy the miss landing criteria.

(15) When delivering the sets, set CPT axis direction ,magnetic field to 0 Gauss and degauss it from outside.

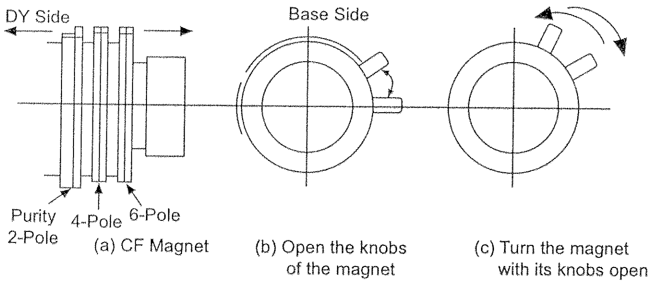
13.4. Focus Adjustment

NO.	MODEL	CPT	Condition	Focus VR setting position
1	27MM20B	A68KSA30X (D) (HED-US)	· Recieve the cross-hatch signal for PC mode. · Set user control to memory initialize.	Turn the Focus VR gradually clockwise from the full counterclockwise position. Then set it to the point where the focus of the 6th vertical line from the screen center becomes best.



13.5 Static Convergence Adjustment

(1) Receive a cross-hatch signal and set Brightness to the center and Contrast to minimum.



(a) CF Magnet

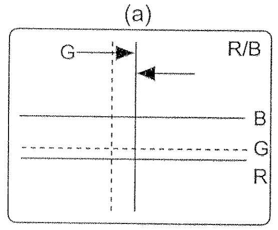
(b) Open the knobs of the magnet

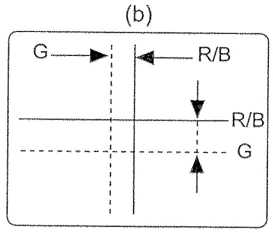
(c) Turn the magnet with its knobs open

FIGURE 1-4-2

(2) Open the knobs of 4-pole magnet (2 sheets) (Figure 1-4-1(b)) and match the blue/red vertical lines at the center of the screen as shown in Figure 1-4-2(a).

(3) Turn the 4-pole magnet with its knobs open (Figure 1-4-1(c)) and match the blue/red horizontal lines as shown in Figure 1-4-2(b).





13.6 Dynamic Convergence adjustment

(1) Insert an adjustment wedge (temporary) between the top of DY opening and CPT funnel as shown in Figure 1-5-1.
By inserting the wedge gradually, match the red and blue vertical lines at the top and bottom of the screen and also match the red and blue horizontal lines of both sides of the screen as shown in Fig. 1-5-2(a).

(2) Adjust by swinging in the right/left directions of DY while observing 6 and 12 horizontal lines of the screen and match the red and blue horizontal lines.
As shown in Fig. 1-5-2(b), when the blue is outside from the red on CPT screen, insert the DY fixing wedge between the right-side DY viewed from the rear of CPT and CPT funnel.

(3) As shown in Fig. 1-5-2(c), when the blue is inside from the red on CPT screen, insert the wedge between the left-side DY and CPT funnel.

(4) Insert two DY fixing wedge with approximately 120 to the fixing wedge inserted in item (2) or (3) and remove the adjustment wedge (temporary).
Use the DY fixing wedge after peeling off the tape.
After proper location, press and adhere it to the funnel.

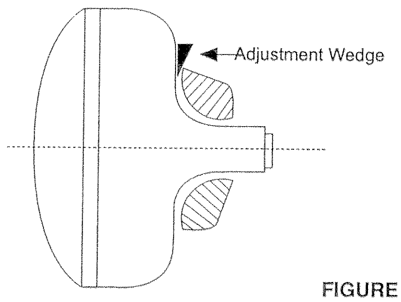
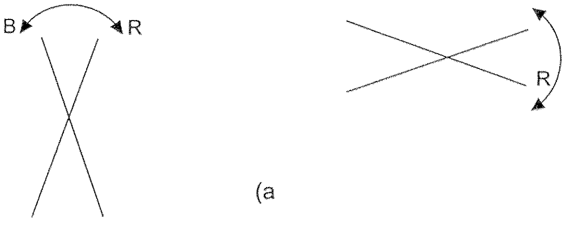
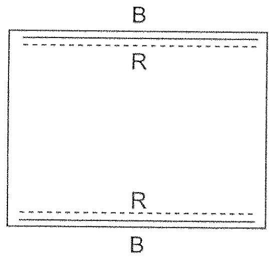
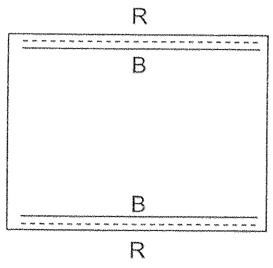


FIGURE 1-5-1





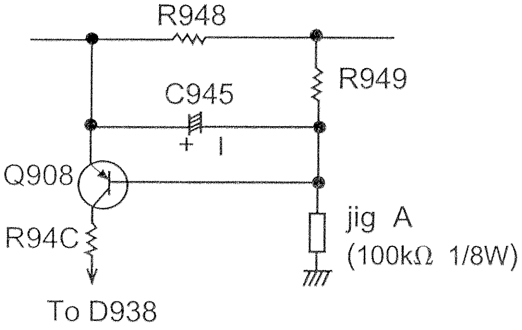


14. Protection Circuit Check

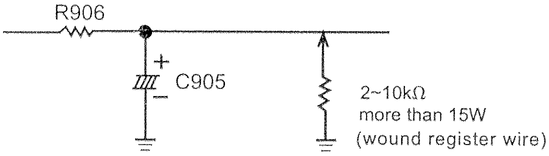
14.1 FBT protection circuit operation check.

Checking Preparation

(1) Set “Contrast” to Max, “Bright” to Center.)
Checking Prcedure
(2) Connect jig A between Q908 base and grand, check that picture disappears.


R948
C945
R949
+
Q908
R94C
jig A
(100kΩ 1/8W)
To D938

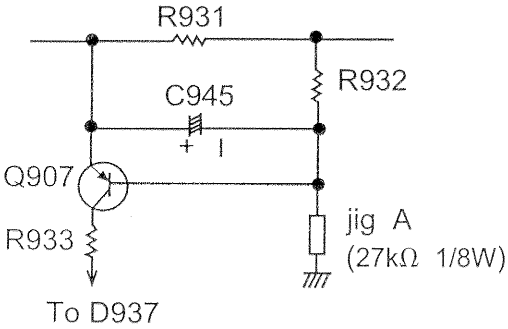
(2) Immediately after checking, Disconnect the power cord of the set.
(3) Discharge C905 as follows.


R906
+
C905
2~10kΩ
more than 15W
(wound register wire)

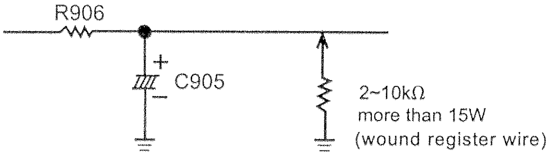
14.2 Check +15V short protection circuit.

Checking Preparation

(1) Connect jig A between Q907 base and grand, check that picture disappears.


R931
C945
R932
+
Q907
R933
jig A
(27kΩ 1/8W)
To D937

(2) Resistor immediately and the power cord.
(3) Discharge C905 as follows.


R906
+
C905
2~10kΩ
more than 15W
(wound register wire)

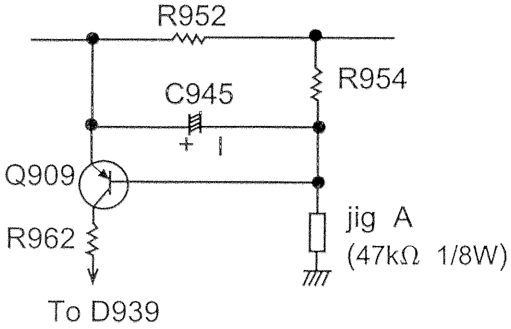
14.3 Check +14V short protection circuit.

Checking Preparation

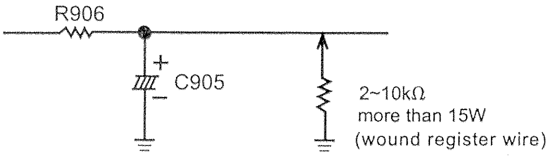
(1) Contrast Max, Bright Center.

Checking Procedure

(1) Connect jig A between Q909 base and grand, check that picture disappears.


R952
C945
R954
+
Q909
R962
jig A
(47kΩ 1/8W)
To D939

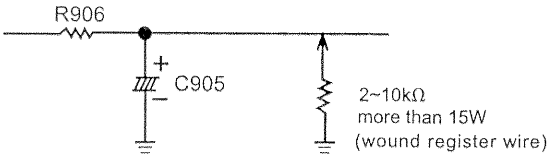
(2) Resistor immediately and the power cord.
(3) Discharge C905 as follows.


R906
+
C905
2~10kΩ
more than 15W
(wound register wire)

14.4 Load short protection circuit operation check.

Checking Procedure

(1) Receive Hitachi circle pattern signal.
(2) Set “Contrast” max, Bright Center.
(3) After turning on the switch of the set.
Confirm the DC voltage of D021 each cathode side.
These voltage should be 6V+1.0V.
(4) Short-circuit the both ends of R091and check that the picture disappears within 2~3 sec..
(5) Disconnect short-circuit for r091 and the power cord.
(6) Discharge C905 as follow.


R906
+
C905
2~10kΩ
more than 15W
(wound register wire)

Circuit Descriptions

1. ET TUNER (ET-452A)

This chassis uses a 181 channel ET tuner in which the tuner section and channel selector PLL section (prescaler buit-in) are made into one unit.
Figs. 1-1 and 1-2 shows its composition.

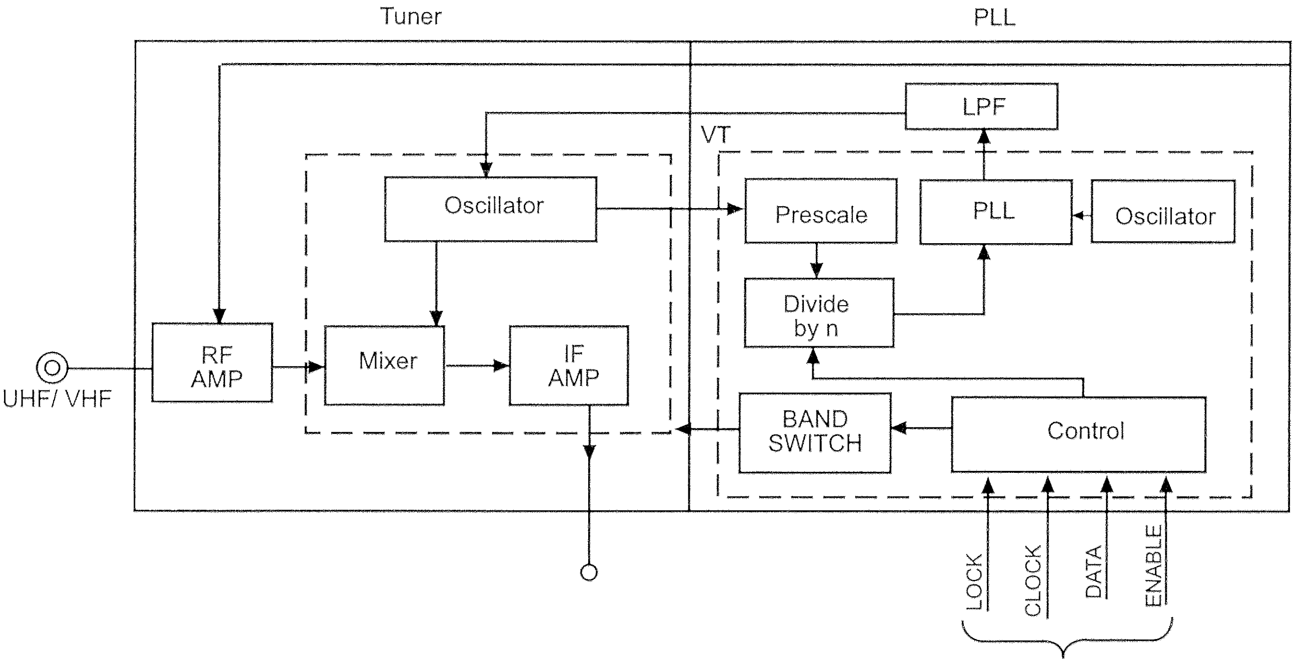

Tuner
PLL
LPF
VT
Oscillator
Prescale
PLL
Oscillator
Divide by n
RF AMP
Mixer
IF AMP
UHF/ VHF
BAND SWITCH
Control
LOCK
CLOCK
DATA
ENABLE

Fig. 1-1 Block diagram of the ET Tuner

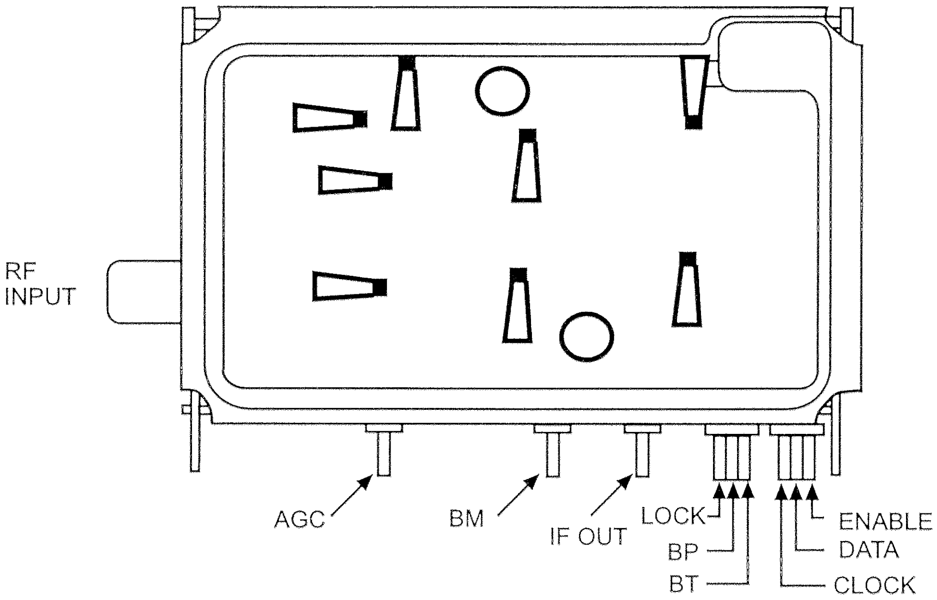

RF INPUT
AGC
BM
IF OUT
LOCK
BP
BT
ENABLE
DATA
CLOCK

Fig. 1-2 ET Tuner (ET-452A)

2. POWER SUPPLY

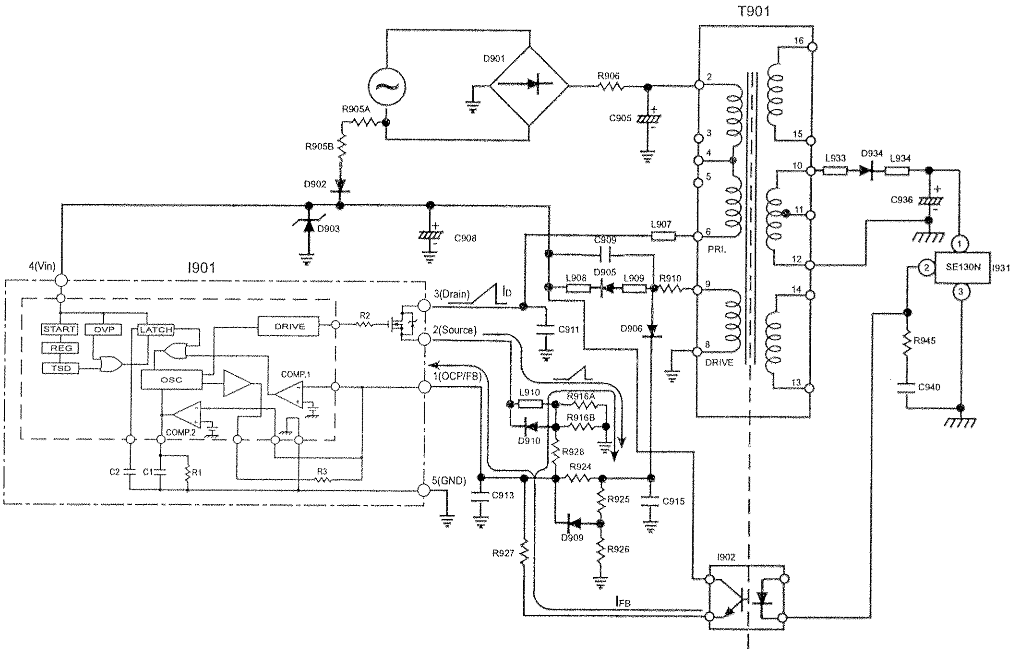


FIG.2. I901 and its related circuits

When the unit is connected to the AC line, the AC voltage is rectified by D901, charging C905 through the current limiting resistor R905, resulting in 170VDC across the primary winding of T901. Fig.2 shows the primary supply circuit.

2.1. I901 START UP CIRCUIT

Diode D902 is used to provide about 16V for I901 pin 4(V in) to start I901. After the control circuit starts, the Vin voltage starts to decrease. The 170 volts at the primary winding of T901 induces a voltage in the drive winding (pins 8 and 9). This is rectified by D905 and charges C908 to a potential above the shutdown voltage of I901 Vin(10V). This voltage is added to the Vin to provide stability, keeping I901 operating.

2.2. I901 SWITCHING OPERATION.

The internal oscillator of I901 drives an internal MOSFET. The MOSFET drain current Id, flows across R916A/B. During the ON time, the internal capacitor C1 is charged to 6.5V. Terminal 1(OCP/FB) thershold voltage is 0.73 ~1.37V typical. When pin 1 reaches the threshold voltage of 0.73V, the internal comparators turns the MOSFET off, and C1 discharges to approx. 3.7V. During the OFF time(50uS typical), the energy in T901 is released, and the quasi-resonant signals developed in the drive winding are added to pin 1 of I901(via a Delay circuit D906, D909, R924, R925, R926 and C915) along with the control voltage to keep the MOSFET in its OFF state.

Function of some external components:

1. **C911**- Resonance capacitor to smooth the rising edge of the pulse voltage developed at the MOSFET (D) pin 3.
2. **D910/L910**- D910 reduces switching loss in the OFF-state. L910 performs the same function in the ON-state.
3. **C5** reduces noise at the turn on of the MOSFET.

2.3. I901 OUTPUT REGULATION CIRCUIT.

The drain current Id of the MOSFET output is controlled by a feedback current(Ifb) obtained via I902 from the +B error amplifier I931 on the secondary side of T901.
The voltage at I931 pin 2 is directly proportional pin 1. Any variations in the voltage at pin 1 due to load changes causes variations at pin 2. Since it is the peak value of the MOSFET Id that is detected at the OCP/FB terminal of I901 to control its oscillator output, the Ifb is added to the Id. When the peak value of the Id changes, the oscillator switching frequency changes to stabalize the MOSFET output which in turn stabalizes the +B voltage at the secondary side of T901.

2.4. I901 OVERCURRENT PROTECTION(OCP)

This is a pulse by pulse detection of the peak value of the drain current (Id). The voltage drop across R916A/B between the source terminal (pin 2) and GND is input to the OCP terminal . The OCP operation voltage is set above the threshold of 0.73V. When an over current condition is sensed due to some excessive load on the secondary side, a voltage drop occurs between the source terminal and GND to decrease the gate drive voltage and reduce the output switching current of the MOSFET.

2.5. I901 OVERVOLTAGE PROTECTION(OVP).

This circuit functions as protection of the Vin terminal against over voltage since it is supplied from the drive winding of T901. The OVP operation voltage is 22.5V typical. This internal circuit triggers an internal latch circuit and stops operation when the Vin terminal voltage exceeds 22.5V. When the latch circuit is ON, the Vin terminal voltage fluctates between 10~16V (typ.).
To release the latch circuit, disconnect the AC input supply by removing the AC line cord.

2.6 I901 THERMAL SHUTDOWN CIRCUIT.

This circuit triggers the latch circuit(as described in item 2.5 above) when the case temperature exceeds 140C.

2.7 T901 SECONDARY SUPPLY VOLTAGES.

SUPPLY VOLTAGE	SOURCE	RECTIFIER	REGULATOR
1. +130V	T901(PIN#10)	D934	I901
2. +15V	T901(PIN#16)	D932	-------
3. +14V	T901(PIN#14)	D936	------
4. +12V-S	+14V	------	Q914
5. +5V	+14V	------	-------
6. +12V	+14V	------	Q707
7. +9V	+12V	------	Q705

2.8 STAND-BY POWER SUPPLY.

In stand-by mode the +14V supply is used to provide +5V for I001 Vcc. I001 remains in stand-by mode until the power button is pressed.

When the power is turned on, I001 pin (31) goes high, and Q783 conducts and Q782 is cut-off. Q781(H-Vcc +12 regulator) conducts, providing +12V for H-Vcc. The H-Vcc supplies IN71 the H/V osc. and I201 to start the deflection circiuits.

2.9 PROTECTION CIRCUITS.(See Fig. 2-1)

2.9.1 HIGH VOLTAGE HOLD DOWN CIRCUIT.

The 56V line from the FBT is used to detect HV variations. If the HV rises to an unsafe level, D719 conducts. Q905(G) rises to 0.7V and conducts to provide a return path for I904. I904 will conduct and cause Q901 to latch, stopping I901 operation. The unit will remain in this state until the AC supply line is disconnected.

PROTECTION CIRCUIT -DETECTION COMPONENTS FOR Q901,Q905.

ITEM	DETECTION COMPONENT
+B (overvoltage)	D940, D941
FBT(+B overcurrent)	Q908, D938
+14V	Q909, D939
+15V	Q907, D937
HV	D719
I601(V.out)	D702
VT	D703, I001
+25V	D717, I001
+5V-2	DN92, I001
+5V	D021, I001
+9V	D020, I001

2.9.2 I001 PROTECT DETECTION.

The protect line is connected to the protect in pin (8) of I001. When a low is detected at pin (8) for more than 2 seconds, pin(32) the protect out line goes high.D009 conducts and triggers Q905 and Q901.

PROTECTION CIRCUITS

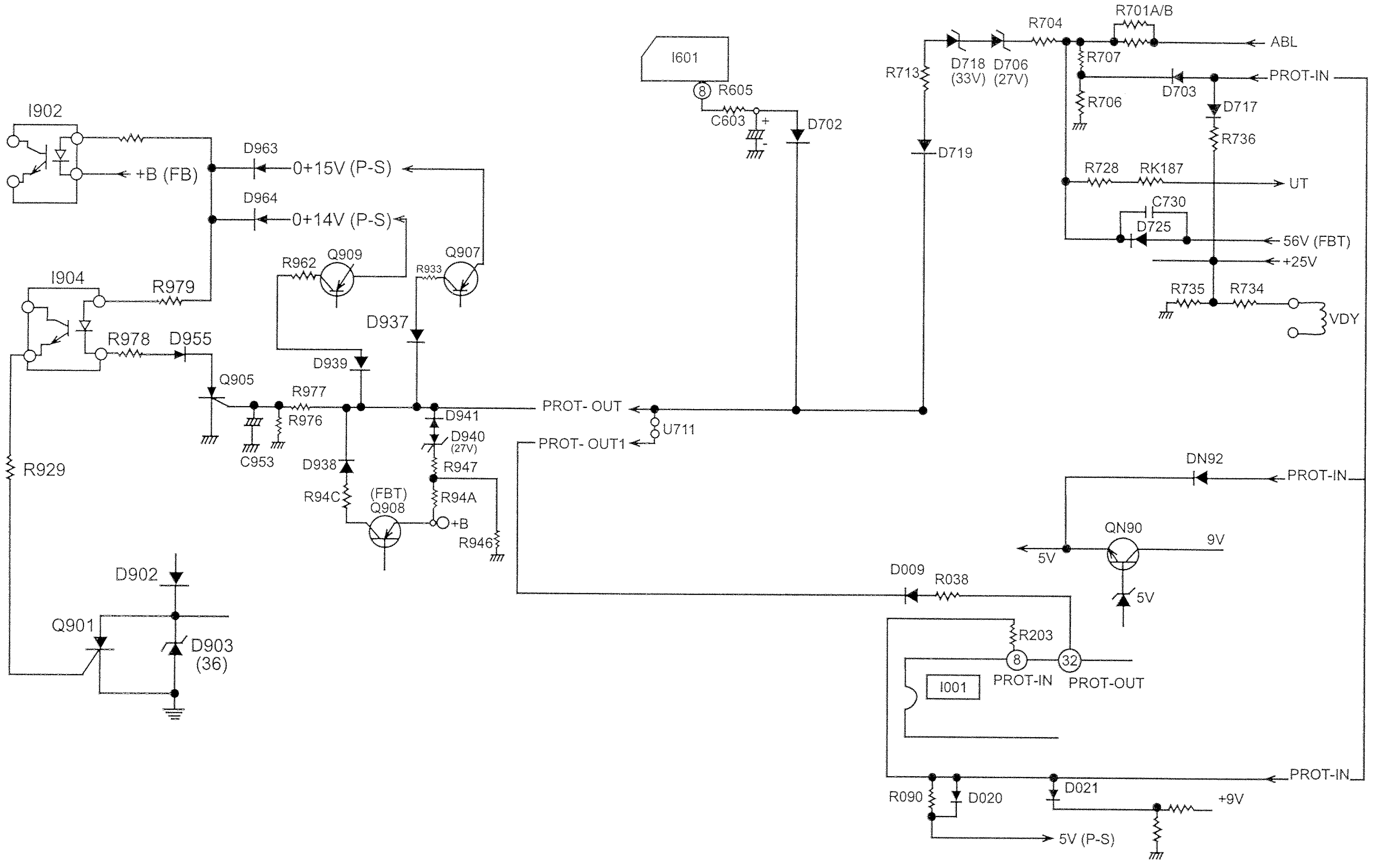

I601
8
R605
C603
D702
R713
D718
(33V)
D706
(27V)
R704
R701A/B
ABL
R707
PROT-IN
D703
R706
D717
R736
D719
R728
RK187
UT
C730
D725
56V (FBT)
+25V
R735
R734
VDY
I902
D963
0+15V (P-S)
+B (FB)
D964
0+14V (P-S)
R962
Q909
R933
Q907
I904
R979
D937
R978
D955
D939
Q905
R977
R976
C953
D941
D940
(27V)
R947
D938
R94C
(FBT)
Q908
R94A
+B
R946
PROT- OUT
U711
PROT- OUT1
R929
D902
Q901
D903
(36)
DN92
PROT-IN
QN90
9V
5V
5V
D009
R038
R203
8
32
PROT-IN
PROT-OUT
I001
PROT-IN
R090
D020
D021
+9V
5V (P-S)

Fig. 2-1

3. Microprocessor I001 (M3721MF-2115P) Pin Descriptions. (see fig.3)

3.1 I001 PIN FUNCTIONS.

(1) This is the input for the H. Sync. signal for OSD.

(2) This is the input for the V. Sync. signal for OSD.

(3) AFC AD input from I201 (44).

(4) Interrupt request line from Mouse control IC IY02.

(5) 15KHz input from TV-VIDEO

(6) 31KHz input (PC-H) when PC is selected.

(7) NC

(8) Protection circuit (approx. 2V or less). When a low is detected (approx. 2V or less) the protection output pin (32) is set to high.

(9) INPUT- for front control keys
Ch. UP =1.0V INPUT=3.5V
Ch. DOWN=1.6V Menu=4.1V
Vol. UP =2.2V
Vol. Down =2.9V

(10) TV/PC3- mode switching line. This output is +5V when PC mode is selected.

(11) Cont. PC.- This is PC mode contrast control. The output voltage range is 0V to 2.8V

(12) BEEP.- This sound is activated when memory is initialized.

(13) 60/70Hz- This signal switches vertical sync. in PC mode for 60Hz or 70Hz.
640x480(H=31.7KHz, V=60Hz)Pin(13) 0V
640x480(H=31.7KHz, V=70Hz)Pin(13) 4V

(14) Enable - When the channel selector buttons are pressed this pin output a "High" to the tuner to select channels.

(15) RC IN - This is the input for remote control signals from the R/C receiver "U001"

(16) V-State - This is the data communication - 10Nline for IY02 (Mouse Controller).

(17) H-State - This is the clk communication line for IY02 (Mouse Controller).

(18) VCC +5V input for analog circuit operative

(19) HLF, **(20)** RVCO
This pin provides connection to an extreme RC filter for internal "timing signal generating" circuit of the CCD slicer.

(21) V Hold
This pin provides connection for an external capacitor for the "reference voltage generating" circuit of the CCD slicer.

(22) CVIN is the input for the composite video for CCD.

(23) CNVSS is connected to GND

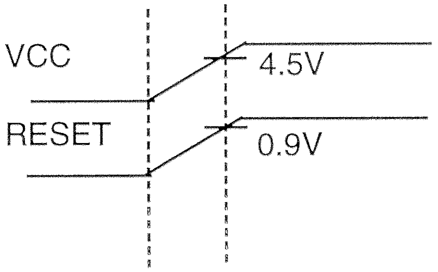
(24) XIN **(25)** XOUT
These pins are connected to an external oscillator circuit for the internal clock circuit when power-on this xin clock start oscillation. In stand-by the oscillation frequency is 32 KHz. With the TV set on and CCD on, oscillation frequency is 8MHz.

(26) GND

(27) VCC +5V Input

(28) OSC IN **(29)** OSC OUT
These pins are connected to an external LC circuit to provide a clock for OSD.

(30) RESET
When the power is turned on, a reset is initiated to perform RAM check and read last data input to the EEPROM.
The reset pin is held "L" (0.9V or less) for Approx. 3us until the VCC and AVCC rises to 4.5V or more. IC I003 (Reset IC) functions to keep the reset voltage "L" while the input power source rises. The timing is set by C051, C018, and R037



(31) POWER
When power is turned on, this pin goes "H" to switch Q783 and Q782 to obtain H-VCC from Q781 to start the horizontal and vertical oscillators.

(32) PROTECT-OUT
This pin is "L" at normal operation. When a "L" is detected at pin (8) "Protect In" for more the 2 seconds, this pin (32) goes "H" to operate the protection circuit.

(33) TV/PC2
This pin switches TV-RGB/PC-RGB and TV Audio/PC-Audio.
In TV mode it is "H"
In PC Mode it is "L"

(34) Input
This pin switches TV video and audio between RF, S-video, and A/V inputs.
In TV mode it is "L"
In Vdeo mode it is "H'
In PC-MODE it is "L"

(35) TV/PC1
This pin switches TV and PC H/V sync.
Selector IC IN6A.
In TV mode it is "L"
In PC Mode it is "H"

(36) Data
This pin is the input to detect H/V sync.
in PC mode. The H/V sync. comes IN01 (sync. processor IC)

(37) SDA1
This is the data in/out for I2C communication.

(38) Clock
This is the input to detect H/V Sync. polarity in PC mode.

(39) SCL1
This is the clock for I2C communication

(40) Intensity (Half Tone)
When OSD is on-screen, this pin is "H". It switches Q581 to reduce the level of the background video.

(41) Matrix-out **(42)** Matrix-In1
These are the inputs for the power button on the control panel, to turn the tv set on or off

(43) Matirx - IN2 **(44)** Matrix-IN3
Inputs for H/V State

(45) H. Center
This is a PWM signal used to vary the H center in PC Mode. This signal goes to IC IN41 which controls the H.phase.

(46) INt. Sp
This turns the internal speakers on or off. When the speakers are on, this pin is "L" When the speakers is set to "Off" this pin is "H" and switches Q411 to mute I403 (Audio output).

(47) P. Blk
This pin mutes the video when changing channels or selecting A/V inputs or PC Mode.

(48) MUTE
This is the output signal used to mute the audio when changing channels. When the Mute button is pressed, this pin is set to "H" and switches Q411 to mute I403.

(50) OSD-R **(51)** OSD-G-**(52)** OSD-B
This is the OSD output for both TV-OSD and PC-OSD. TV-OSD is sent to I201 (Video/Chroma) and PC-OSD is sent to I551 (RGB SW).

I001 (M3721MF-211SP) Pin Descriptions

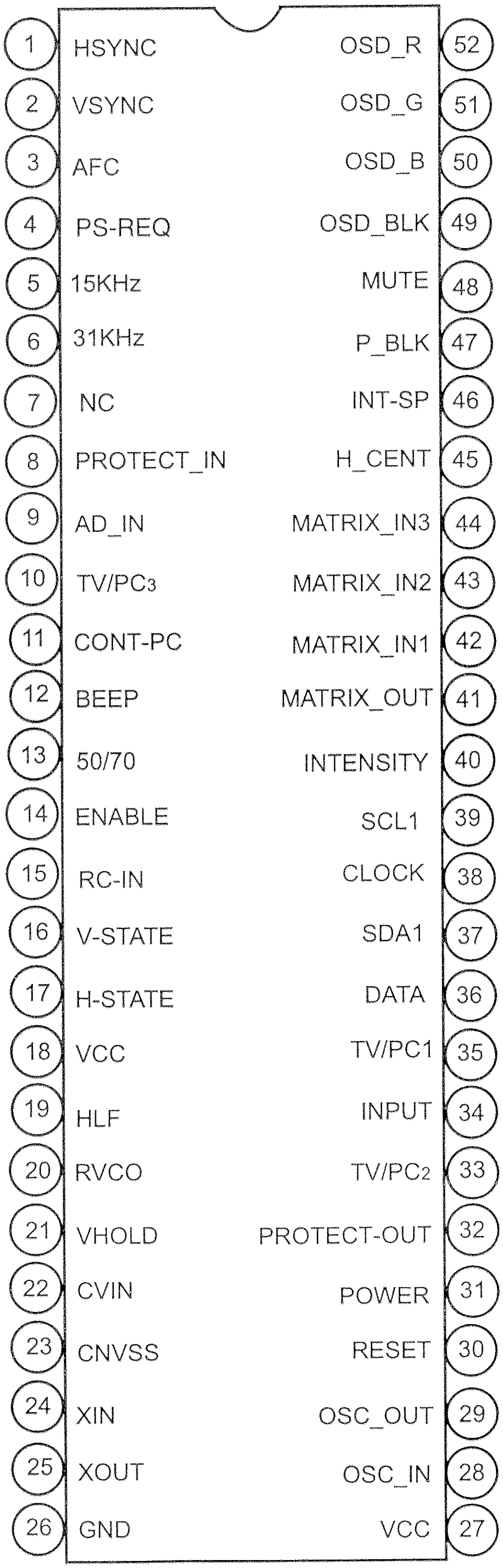

1
HSYNC
2
VSYNC
3
AFC
4
PS-REQ
5
15KHz
6
31KHz
7
NC
8
PROTECT_IN
9
AD_IN
10
TV/PC3
11
CONT-PC
12
BEEP
13
50/70
14
ENABLE
15
RC-IN
16
V-STATE
17
H-STATE
18
VCC
19
HLF
20
RVCO
21
VHOLD
22
CVIN
23
CNVSS
24
XIN
25
XOUT
26
GND
27
VCC
28
OSC_IN
29
OSC_OUT
30
RESET
31
POWER
32
PROTECT-OUT
33
TV/PC2
34
INPUT
35
TV/PC1
36
DATA
37
SDA1
38
CLOCK
39
SCL1
40
INTENSITY
41
MATRIX_OUT
42
MATRIX_IN1
43
MATRIX_IN2
44
MATRIX_IN3
45
H_CENT
46
INT-SP
47
P_BLK
48
MUTE
49
OSD_BLK
50
OSD_B
51
OSD_G
52
OSD_R

FIG. 3

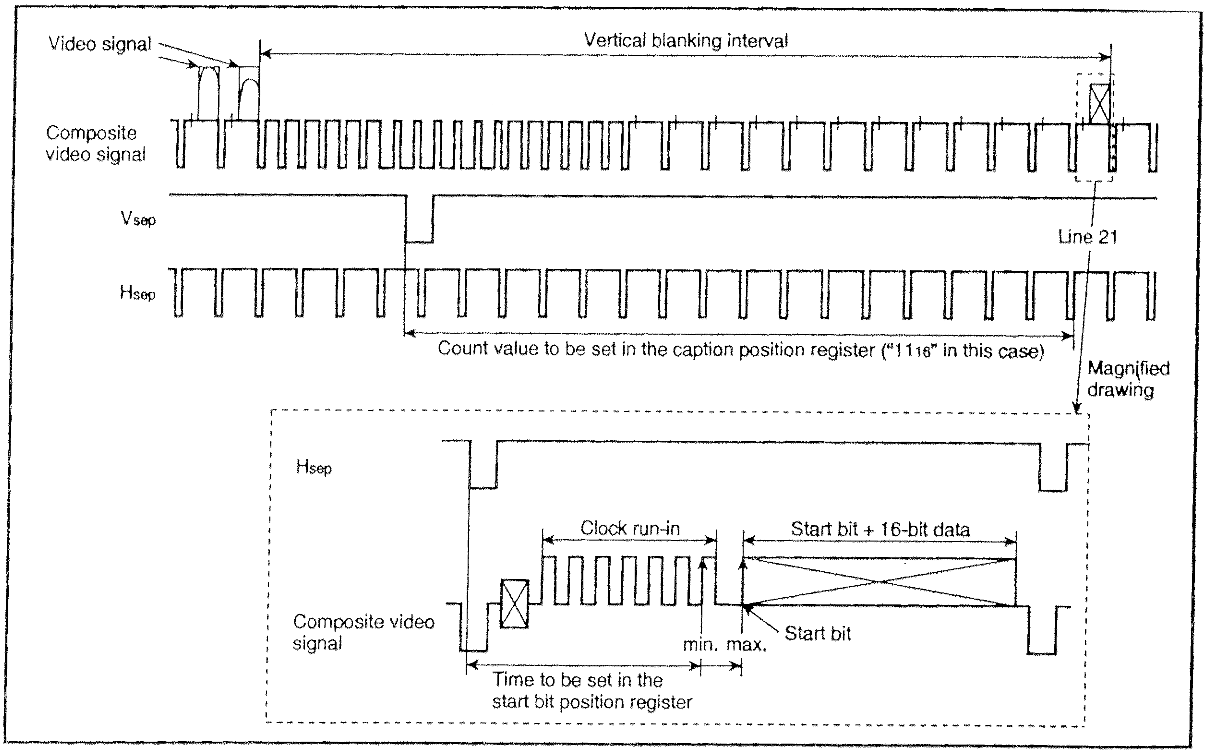

Video signal
Vertical blanking interval
Composite video signal
Vsep
Line 21
Hsep
Count value to be set in the caption position register ("11_{16}" in this case)
Magnified drawing
Hsep
Clock run-in
Start bit + 16-bit data
Composite video signal
min. max.
Start bit
Time to be set in the start bit position register

Fig. 3.1

3.2 CLOSED CAPTION DECODING(I001)

I001 includes a data slicer for CCD operation. The Data Slicer removes the caption data superim posed in the vertical blanking interval (line 21) of the composite video signal. (see fig. 3.1and 3.2)

1. CLAMP AND LOW PASS FILTER.
   This filter attenuates noise on the composite video signal. An external low pass filter is also used for this purpose (C042, R034, and R036).

2. SYNC. SLICER.
   This circuit removes the composite sync.

3. SYNC. SIGNAL SEPERATION CIRCUIT.
   This circuiot separates the horiz. and vert. sync form the composite sync.

4. TIMING GENERATING CIRCUIT.
   This circuit generates a ref. clock signal and other tim ing signals. This ref. clock signal is used for the data slicer and the OSD functions.

5. DATA SLICE LINE SPECIFICATION CIRCUIT.
   The counter is reset at the falling edge of the V.sync. at increments of every 1 H.sync. pulse. When the When the counter value matches thje specified value of the Caption position register, this H.sync. is sliced.

6.1REFERENCE VOLTAGE GENERATING CIRCUIT.
This circuit generates the slicing voltage using the amplitude of the Clock Run-in pulse.

6.2 COMPARATOR.
This compares the voltage of the composite signal with the ref.(V) in 7.1. to convert the composite video into digital value.

7. START BIT DETECTING CIRCUIT
   The first rising video is detected as a start bit by sam pling the comparator output.

8. CLOCK RUN-IN CIRCUIT.
   The Clock Run-in portion in the composite video is set by this circuit, and is determined by counting the num ber of pulses in the window.

9. DATA CLOCK GENERATING CIRCUIT.
   16 data clock pulses are generated with the start bit to turn on the data slicer.

10. 16 BIT SHIFT REGISTER
    The digital caption data converted by the Comparator is stored in this register, and read out by the data reg isters 1 and 2 to the data bus line and sent to the OSD circuit.

11. CCD WINDOW.
    The boundries of the CCD display on the screen is determined by the High and Low registers of the OSD circuit

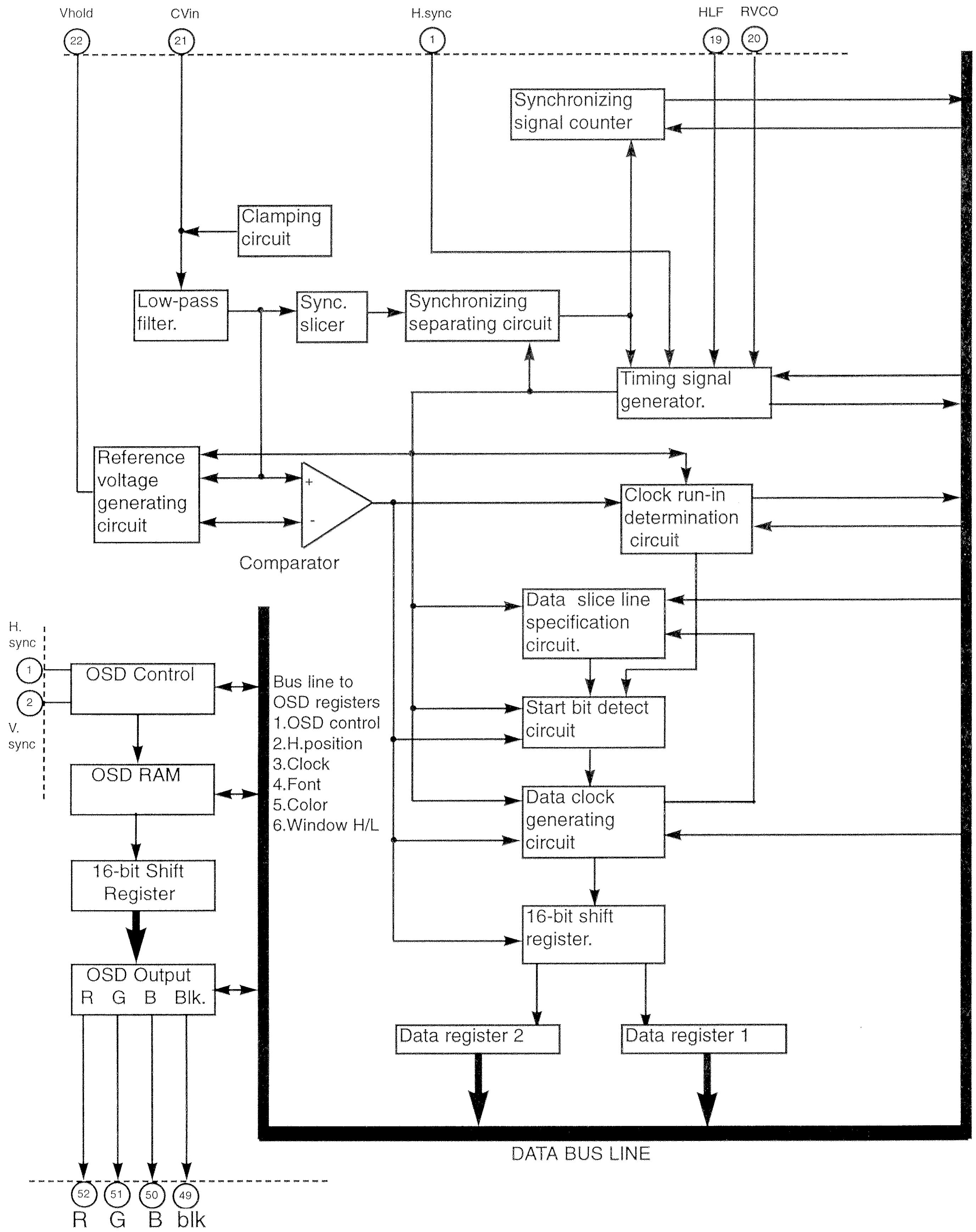
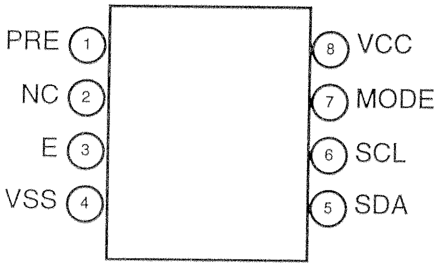

Vhold
CVin
H.sync
HLF
RVCO
22
21
1
19
20
Synchronizing signal counter
Clamping circuit
Low-pass filter.
Sync. slicer
Synchronizing separating circuit
Timing signal generator.
Reference voltage generating circuit
+
-
Comparator
Clock run-in determination circuit
Data slice line specification circuit.
Start bit detect circuit
Data clock generating circuit
16-bit shift register.
Data register 2
Data register 1
DATA BUS LINE
H. sync
1
2
V. sync
OSD Control
OSD RAM
16-bit Shift Register
OSD Output
R G B Blk.
Bus line to OSD registers
1.OSD control
2.H.position
3.Clock
4.Font
5.Color
6.Window H/L
52
51
50
49
R
G
B
blk

Fig. 3.2 I001 INTERNAL CCD BLOCK DIAGRAM

4. Memory IC I002 (ST24C08FB6)

The ST24C08FB6 ic is an 8k electronically erasable/ programmable memory (eeprom), organized as 4 blocks of 256 x 8 bits. The memory is compatible with the I2C standard.


PRE 1
NC 2
E 3
VSS 4
8 VCC
7 MODE
6 SCL
5 SDA

PIN#	SYMBOL	DESCRIPTION
1	PRE	Write protection enable
2	NC	
3	E	Chip enable input
4	VSS	GND
5	SDA	Serial data I/O
6	SCL	Serial clock
7	MODE	Multiple page write mode
8	VCC	Supply voltage

4.1 DEVICE OPERATION

I2C Bus Background

The ST24C08FB6 IC supports the I2C protocol. This protocol defines any device that sends data onto the bus as a transmitter and any device that reads the data as a receiver. The device that controls the data transfer is known as the master and the other as the slave. The master will always initiate a data transfer and will provide the serial clock for synchronization. The ST24C08FB6 acts as the slave device.

Start Condition:

START is identified by a high to low transmission of the SDA line while the clock SCL is stable in the high state.
A Start condition must proceed any command for data transfer. Except during a programming cycle, the ST24C08FB6 continuously monitor the SDA and SCL signals for a Start condition and will not respond unless one is given.

Stop Condition:

STOP is identified by a high to low transition of the SDA line while the clock SCL is stable in the high state. A stop condition terminates communication between the ST24C08FB6 and the master. A Stop condition at the end of the Read command forces standby state. A Stop condition at the end of the write command triggers the internal EEPROM write cycle.

Acknowledge Bit (ACK) :

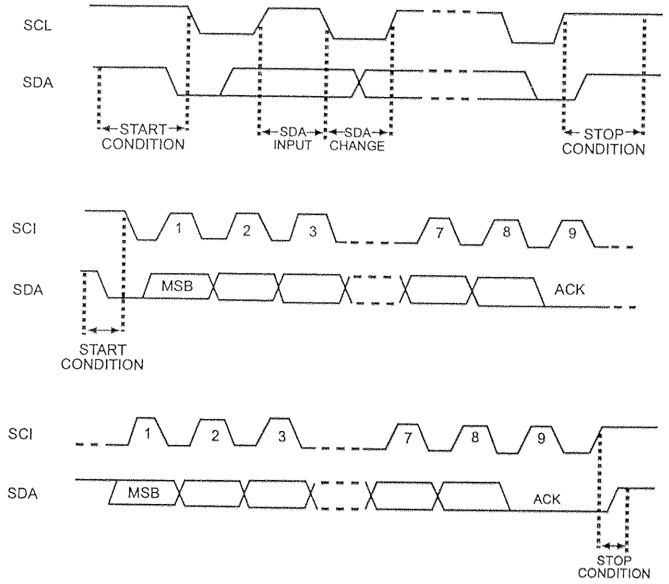
An acknowledge signal is used to indicate a successful data transfer. The bus transmitter, either master or slave, will release the SDA bus after sending 8 bits of data. During the 9th clock pulse period the receiver pulls the SDA bus low to acknowledge the receipt of the 8 bits of data.

Data Input:

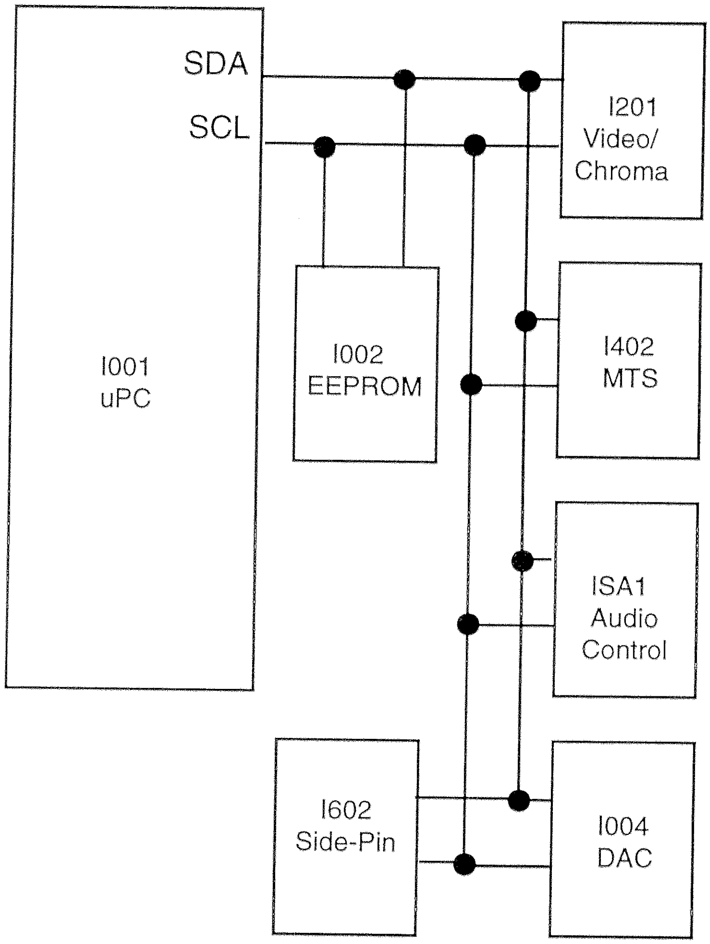
During the data input the ST24C08FB6 sample the SDA bus signal on the rising edge of the clock SCL line is low.

Memory Addressing:

To start communication between the bus master and the slave ST2408FB, the master must initiate a start condition. Following this, the master sends onto the SDA bus line 8 bits (MSD first) corresponding to the device select code (7 bits) and a READ or Write bit.


SCL
SDA
START CONDITION
SDA INPUT
SDA CHANGE
STOP CONDITION
SCI
1
2
3
7
8
9
SDA
MSB
ACK
START CONDITION
SCI
1
2
3
7
8
9
SDA
MSB
ACK
STOP CONDITION

4.2 I2C Communication lines


SDA
SCL
I001
uPC
I002
EEPROM
I201
Video/
Chroma
I402
MTS
ISA1
Audio
Control
I602
Side-Pin
I004
DAC

5. PC-MOUSE Microcomputer IY02 (M37470M4) (see Fig. 5.1 and 5.2)

In PC mode, PC-PS2 mouse can be controlled by the R/C handset through a connection to the PC via the 6pin mini din jack provided at the rear of the unit.
The microcomputer for mouse control is IY02 (M37470M4, an 8-bit controller). I001 the main u-con is the master and IY02 is the slave. Communication between the PC, I001, and IY02 is through Bi-directional Serial Bus of TTL level.

Communication request from the PC is through the PS-2 CLK. and DATA lines. IY02 REQ. output(pin #1) is sent to I001(pin #4). I001 sends CLK and DATA signals from pins 16 and 17 to IY02 pins 2 and 4.

QY44 and QY45 are switches to send clk and data signals to PC via the I/O pins of the jack (JMS).
IY02 pin#18 is the reset. IY03 is the reset IC which holds pin#18 "L" for 2uS or more until the VCC rises to approx. 5V.

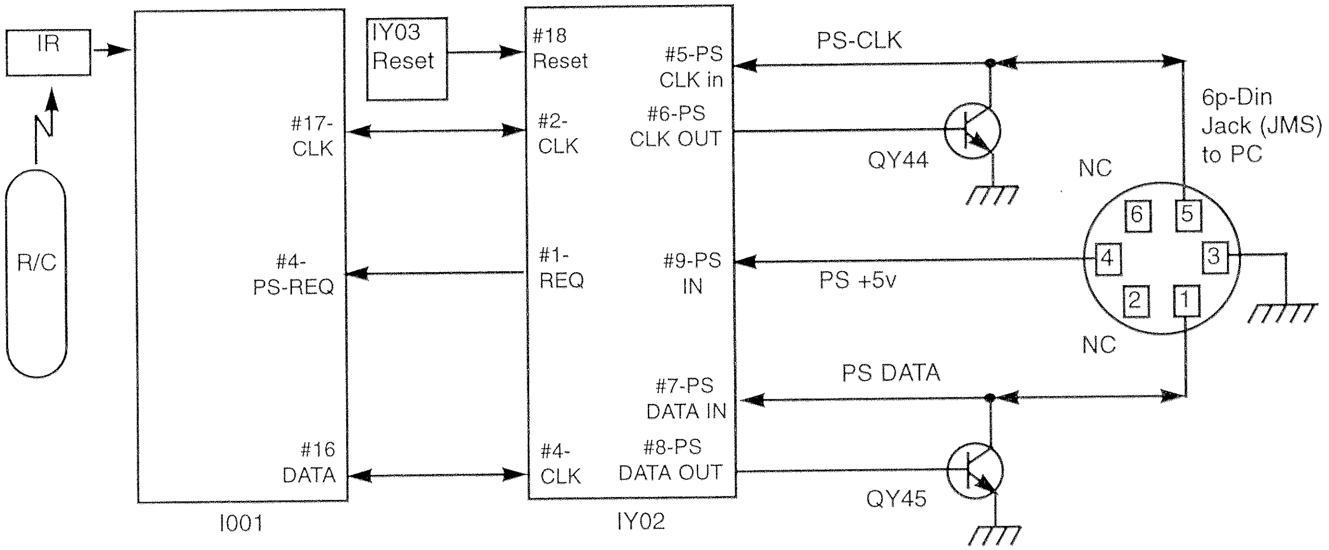

IR
R/C
#17-
CLK
#4-
PS-REQ
#16
DATA
I001
IY03
Reset
#18
Reset
#2-
CLK
#1-
REQ
#4-
CLK
#5-PS
CLK in
#6-PS
CLK OUT
#9-PS
IN
#7-PS
DATA IN
#8-PS
DATA OUT
IY02
PS-CLK
QY44
PS +5v
PS DATA
QY45
NC
NC
6p-Din
Jack (JMS)
to PC
6
5
4
3
2
1

Fig. 5.1 SYSTEM BLOCK DIAGRAM

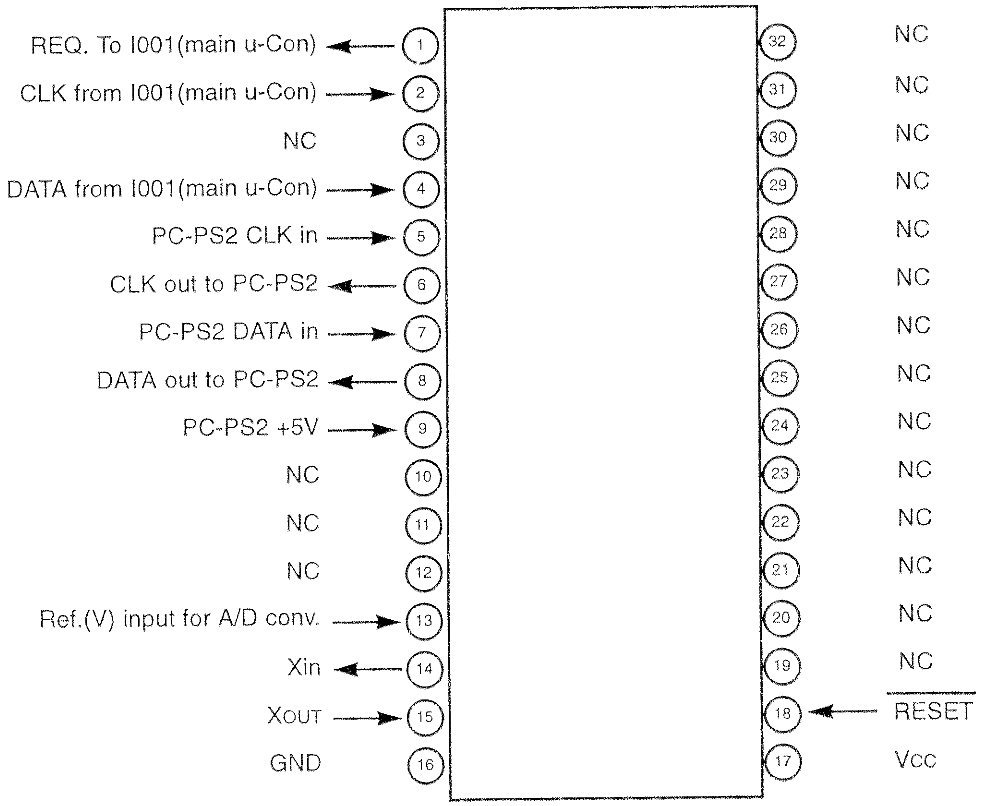
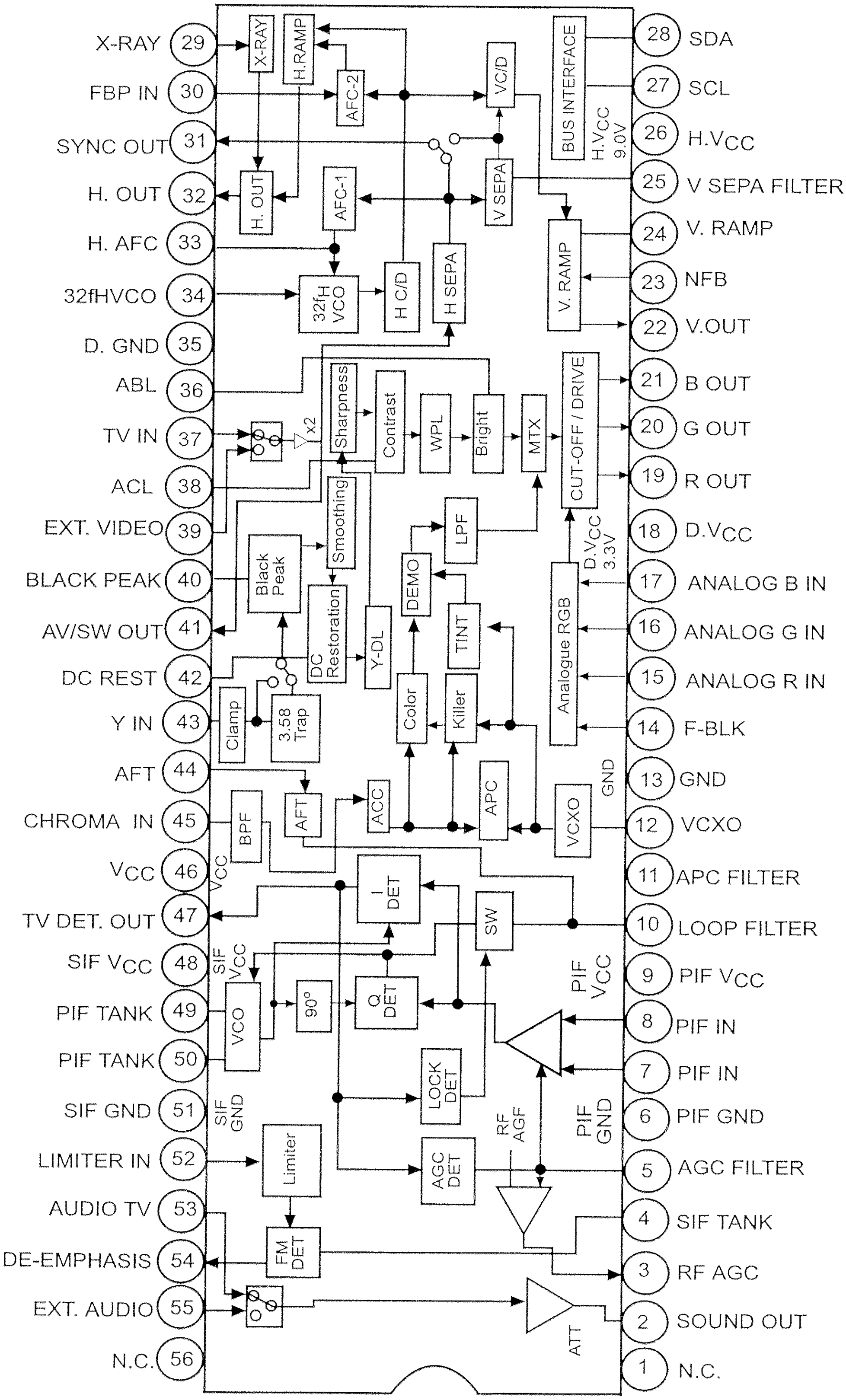

REQ. To I001(main u-Con)
CLK from I001(main u-Con)
NC
DATA from I001(main u-Con)
PC-PS2 CLK in
CLK out to PC-PS2
PC-PS2 DATA in
DATA out to PC-PS2
PC-PS2 +5V
NC
NC
NC
Ref.(V) input for A/D conv.
Xin
XOUT
GND
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
32
31
30
29
28
27
26
25
24
23
22
21
20
19
18
17
NC
NC
NC
NC
NC
NC
NC
NC
NC
NC
NC
NC
NC
NC
RESET
Vcc

Fig. 5.2 IY02 PIN ARRANGEMENT.

6. VIDEO/CHROMA I201 (TA1268N) Pin Description


X-RAY 29
FBP IN 30
SYNC OUT 31
H. OUT 32
H. AFC 33
32fHVCO 34
D. GND 35
ABL 36
TV IN 37
ACL 38
EXT. VIDEO 39
BLACK PEAK 40
AV/SW OUT 41
DC REST 42
Y IN 43
AFT 44
CHROMA IN 45
VCC 46
TV DET. OUT 47
SIF VCC 48
PIF TANK 49
PIF TANK 50
SIF GND 51
LIMITER IN 52
AUDIO TV 53
DE-EMPHASIS 54
EXT. AUDIO 55
N.C. 56
28 SDA
27 SCL
26 H.VCC
25 V SEPA FILTER
24 V. RAMP
23 NFB
22 V.OUT
21 B OUT
20 G OUT
19 R OUT
18 D.VCC
17 ANALOG B IN
16 ANALOG G IN
15 ANALOG R IN
14 F-BLK
13 GND
12 VCXO
11 APC FILTER
10 LOOP FILTER
9 PIF VCC
8 PIF IN
7 PIF IN
6 PIF GND
5 AGC FILTER
4 SIF TANK
3 RF AGC
2 SOUND OUT
1 N.C.
X-RAY
H.RAMP
AFC-2
VC/D
BUS INTERFACE
H.VCC 9.0V
H. OUT
AFC-1
V SEPA
V. RAMP
32fH VCO
H C/D
H SEPA
Sharpness
x2
Contrast
WPL
Bright
MTX
CUT-OFF / DRIVE
Smoothing
LPF
D.VCC 3.3V
Black Peak
DC Restoration
Y-DL
DEMO
TINT
Analogue RGB
Clamp
3.58 Trap
Color
Killer
AFT
ACC
APC
VCXO
GND
BPF
VCC
I DET
SW
SIF VCC
VCO
90°
Q DET
PIF VCC
LOCK DET
SIF GND
RF AGF
PIF GND
Limiter
AGC DET
FM DET
ATT

6.1 Terminal Function TA1268N-2

Pin no.-3 RF AGC
This terminal is for RF AGC output to the tuner.

Pin no.-4 SIF Tank Coil
This terminal is for connecting SIF detect tank coil.

Pin no.-5 AGC Filter
This terminal is for PIF 2nd AGC filter.

Pin no.-6 PIF GND
This terminal is for GND of PIF Circuit.

Pin no.-7, 8 PIF Input
This terminal is for IF input. The typical input value is 90dBuV.

Pin no.-9 PIFVCC
This terminal is for VCC (9V) of PIF circuit.

Pin no.-10 Loop Filter
This terminal is for PIF PLL loop filter.

Pin no.-11 APC Filter
This terminal is for APC Filter.

Pin no.-12 VCXO
This terminal is for 3.58MHz x'tal.

Pin no.-13 GND
This terminal is for Video/Chroma GND.

Pin no.-14 OSD Blanking
This terminal is input for OSD blk.

Pin no.-15, 16, 17 OSD RGB input
These terminals are for OSD RGB signal input.

Pin no.-18 Digital VCC
This terminal is for VCC (9V) for digital circuit.

Pin no.- 19, 20, 21 RGB Output
These terminals are for RGB primary color signal output.

Pin no.-23, 24 NFB, Vertical Ramp
These terminals are for NFB input and vertical ramp output.

Pin no.-25 Vertical Sync.
This terminal is for vertical sync. separation filter.

Pin no.-26 H.VCC
This terminals is for H.VCC (12V) of horizontal circuit.

Pin no.-27, 28 SCL, SDA
These terminals are for input and output of I^2C Bus.

Pin no.-29 X-RAY
This terminal is for input of X-RAY protect circuit.The threshold voltage is 3.5V (Typ.) If this voltage is >3.5V, the H.OUT is pulled to low.

Pin no.-30
Fly-back Pulse Input (FBP)
This terminal is for Fly-Back Pulse input. For reference to H-AFC circuit.

Pin no.-32 Horizontal Output
This terminal is for horizontal pulse output.

Pin no.-33 H.AFC.
This terminal is for horizontal AFC filter. The AFC circuit control the horizontal phase by counting down $32f_H$.

Pin no.-34 32fHVCO
This terminal is for connection of a 32FH (503kHz) ceramic oscillator.

Pin no.-35 D.GND
This terminal is for GND of digital circuit.

Pin no.-36 A.B.L.
This terminal is for A.B.L input.

Pin no.-37 TV Input / V IN
This terminal is the input for the Y-signal. From comb filter.

Pin no.-38 A.C.L.
This terminal is for ABL input for the ACL circuit.

Pin no.-39 External Video Input
This terminal is the input for the Y(s) signal.

Pin no.-40 Black Peak Detection
This terminal is for the filter for black peak detector.

Pin no.-41 Video Switch Output
This terminal is for video to I001 CCD

Pin no.-43 Y input
This is for Y signal input. The typical input amplitude is 1.0V.p.p

Pin no.-44 A.F.T.
This terminal is for AFC output to I001.

Pin no.-45 Chroma Input
This terminal is for chrominace signal input. The typical input signal amplitude is 286mVp.p. (at burst signal).

Pin no.-46 V/C/D VCC
This terminal is for VCC (9V) of video, Chroma and deflection circuit.

Pin no.-47 TV Detection
This terminal is the output of the PIF detected signal.

Pin no.-48 S.I.F. VCC
This terminal is for VCC (9V) of SIF circuit.

Pin no.-49, 50 AFC
These terminals are for connecting a tank coil of PIF detector circuit.

Pin no.-51 S.I.F. GND
This terminal is for GND of SIF circuit.

Pin no.-52 SIF Input
This terminal is for input from the SIF limiter amplifier circuit.

Pin no.-54 De-emphasis
This terminal is for filter of SIF de-emphasis.

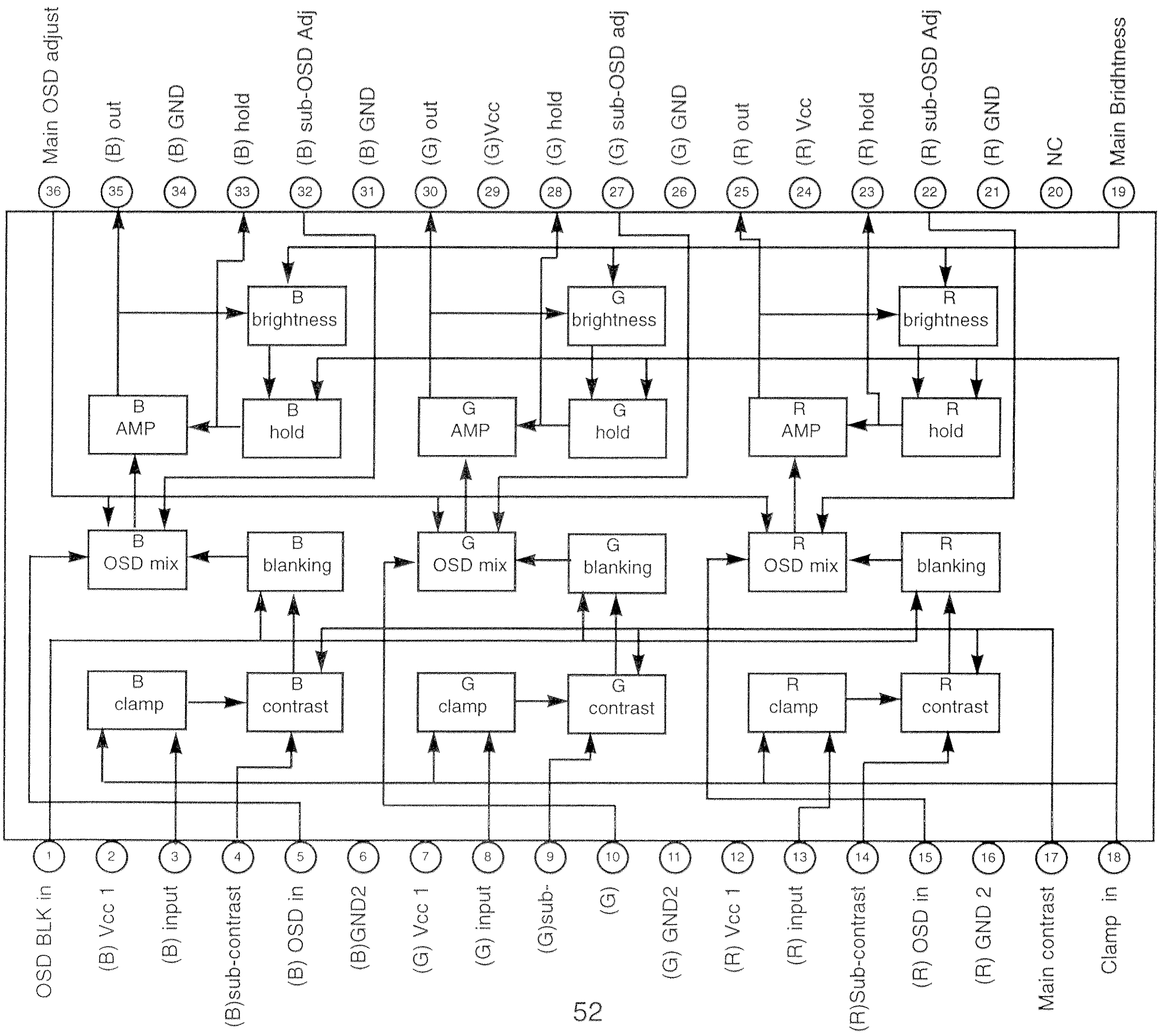
7. PC VGA SIGNAL PROCESSING

The RGB signals input from the VGA jack(JPC), are 75 ohm terminated and goes to the Sound PWB where it passes through high frequency filters XT11, XT12, and XT13. The RGB signals are input to I551. I551 has three individual circuits for RGB processing. The RGB signals are mixed with the PC OSD from I001. Clamping is done by the clamp output DC voltage of IN01. ABL and PBLK are added to the contrast control input pin 17 to blank the picture during retrace periods and to limit the beam current by varying the DC voltage at this pin. The contrast and brightness is set by I004 using I^{2}C adjustment. I004 also set the V. centering, cut-off, and outputs the control for switching I381 chroma out. and a sync. detect control for detecting the sync. polarity.

The RGB signals are amplified and output at from I551 pins 25, 30 and 35 respectively to the I552 RGB switch, where it is switched between the TV RGB and input to the Video output circuit.

See Fig. 7 for the internal structure of I551, and fig. 7.1 for I004 structure.

Fig. 7: I551 (62320SP) structure



Main OSD adjust
(B) out
(B) GND
(B) hold
(B) sub-OSD Adj
(B) GND
(G) out
(G)Vcc
(G) hold
(G) sub-OSD adj
(G) GND
(R) out
(R) Vcc
(R) hold
(R) sub-OSD Adj
(R) GND
NC
Main Bridhtness
36
35
34
33
32
31
30
29
28
27
26
25
24
23
22
21
20
19
B brightness
G brightness
R brightness
B AMP
B hold
G AMP
G hold
R AMP
R hold
B OSD mix
B blanking
G OSD mix
G blanking
R OSD mix
R blanking
B clamp
B contrast
G clamp
G contrast
R clamp
R contrast
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
OSD BLK in
(B) Vcc 1
(B) input
(B)sub-contrast
(B) OSD in
(B)GND2
(G) Vcc 1
(G) input
(G)sub-
(G)
(G) GND2
(R) Vcc 1
(R) input
(R)Sub-contrast
(R) OSD in
(R) GND 2
Main contrast
Clamp in

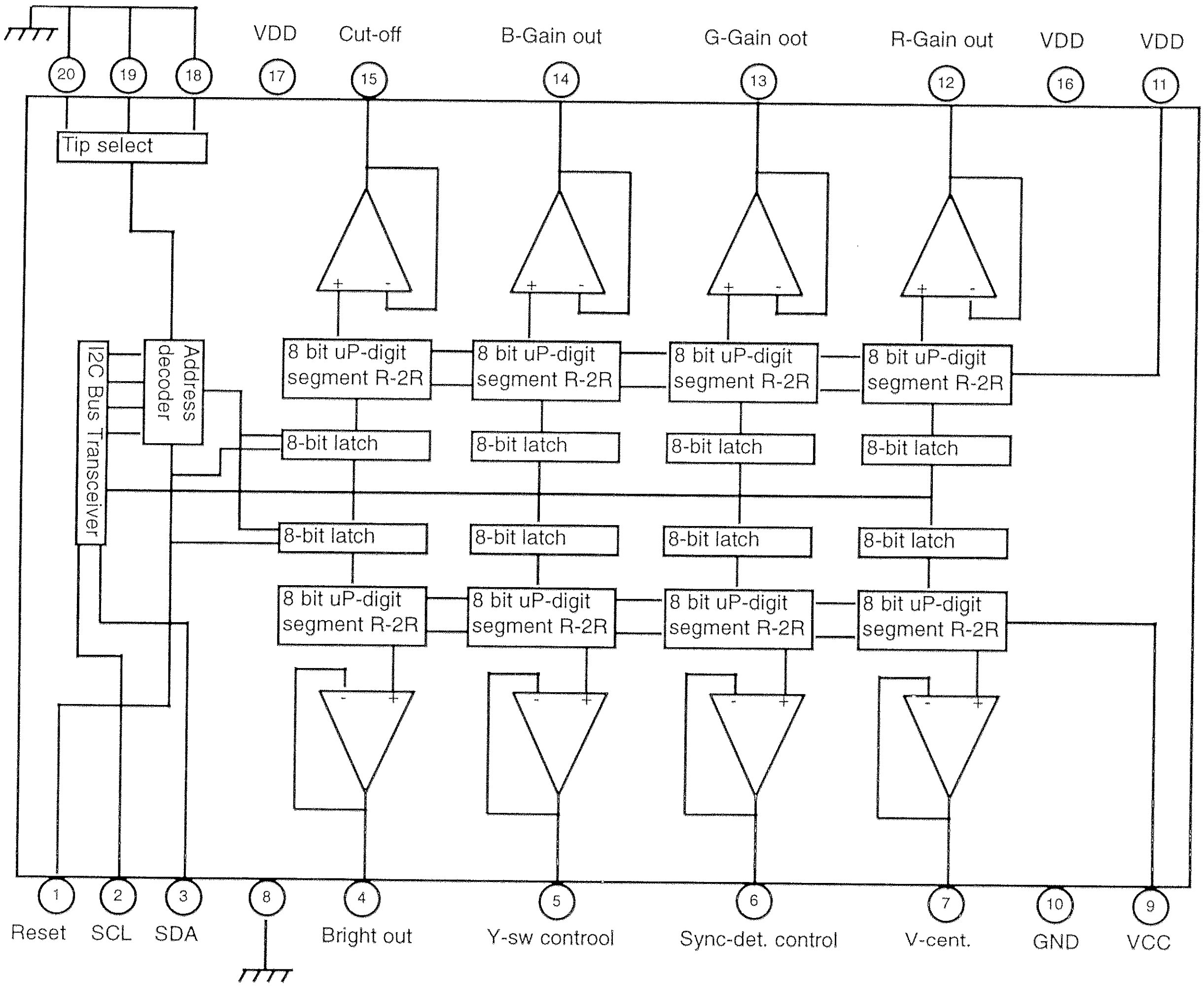

VDD
Cut-off
B-Gain out
G-Gain oot
R-Gain out
VDD
VDD
20
19
18
17
15
14
13
12
16
11
Tip select
I2C Bus Transceiver
Address decoder
8 bit uP-digit segment R-2R
8-bit latch
+
-
1
2
3
8
4
5
6
7
10
9
Reset
SCL
SDA
Bright out
Y-sw controol
Sync-det. control
V-cent.
GND
VCC

Fig. 7.1: I004 (M62393P) structure

8. PC SYNC. SIGNALS PROCESSING.

PC-H/V sync. signals is passed through emitter follower and clamp circuit composed of QN05, QN06, QN07, and QN08 to IN01(Sync. processor). This IC provides the following outputs:

1. Clamping or I551 RGB hold circuits.
2. H/V state signal to I001 to detect sync. or not.
3. H/V polarity to I001 to detect sync. polarity.

The V. sync(VD out) goes directly to IN71(sync. processor)pin 7, while the H.sync(HD out) is processed by IN40, and IN41, two Dual monostable multivibrators to set the H.phase, then sent to IN71 pin 10.

The V.osc. frequency is adjusted to 55KHz by RN7A to set the pull-in range for 60 and 70 Hz signals and is output as the V.Drive at pin 6. In TV mode QN74 is cut-off to stop V.drive. In PC mode, when 70 Hz is selected, QN73 conducts so RN77 is paralled with RN7A and RN7C, to change the V.osc ferquency to 70Hz.

The H.sync is compared to the H.BLK(FBP) and the result signal is output at pin 12 to the AFC LPF and applied back to pin 13. The H.osc frequency is then adjusted to 31.5KHz by RN87 and output at pin 15 as the H.Drive.

See Fig. 8. and 8.1 for the internal structure of IN01, and IN71.

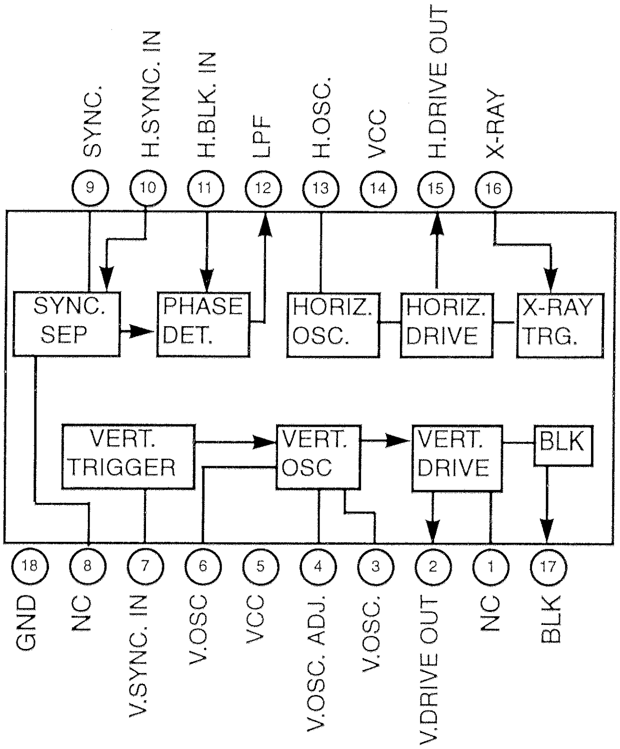

SYNC.
H.SYNC. IN
H.BLK. IN
LPF
H.OSC.
VCC
H.DRIVE OUT
X-RAY
9
10
11
12
13
14
15
16
SYNC. SEP
PHASE DET.
HORIZ. OSC.
HORIZ. DRIVE
X-RAY TRG.
VERT. TRIGGER
VERT. OSC
VERT. DRIVE
BLK
18
8
7
6
5
4
3
2
1
17
GND
NC
V.SYNC. IN
V.OSC
VCC
V.OSC. ADJ.
V.OSC.
V.DRIVE OUT
NC
BLK

Fig. 8 IN71 (HA11423) STRUCTURE

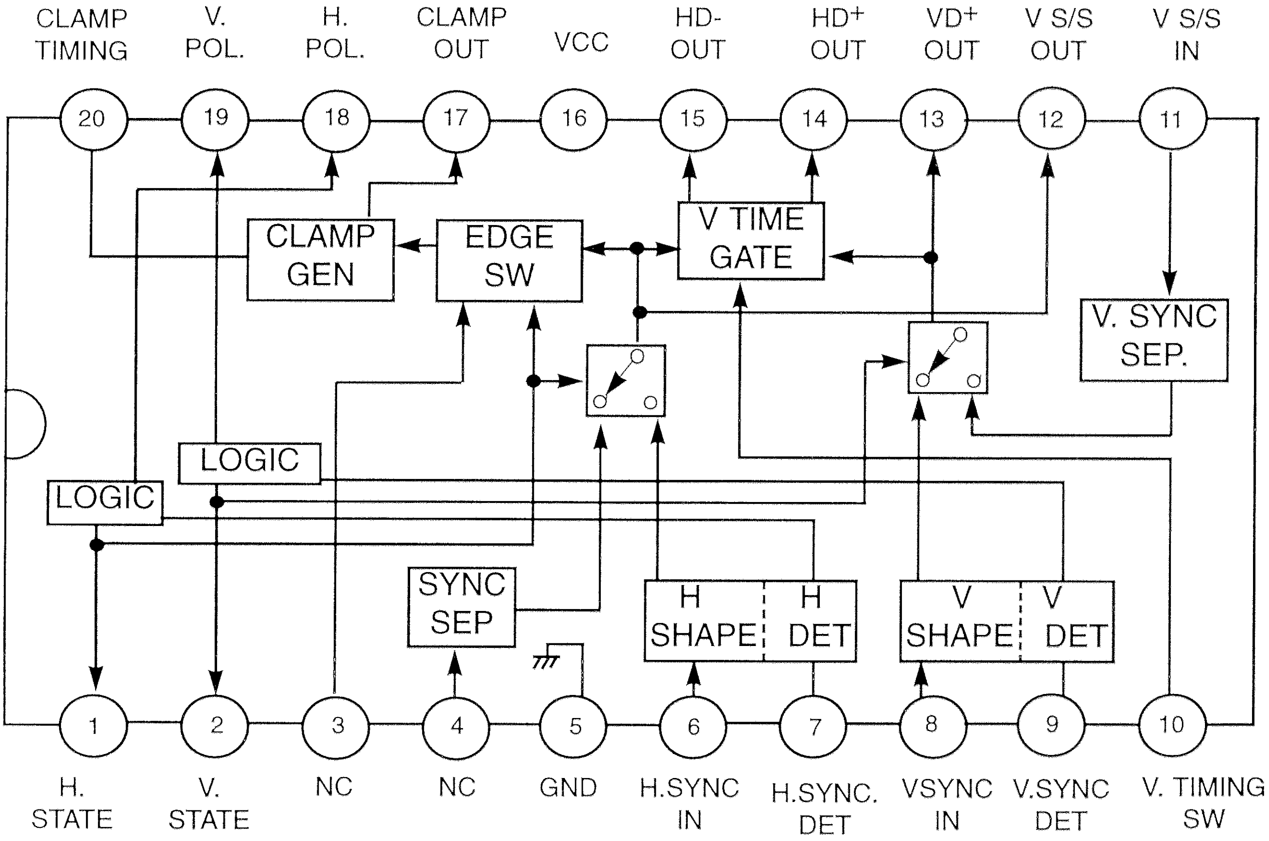

CLAMP TIMING
V. POL.
H. POL.
CLAMP OUT
VCC
HD- OUT
HD+ OUT
VD+ OUT
V S/S OUT
V S/S IN
20
19
18
17
16
15
14
13
12
11
CLAMP GEN
EDGE SW
V TIME GATE
V. SYNC SEP.
LOGIC
LOGIC
SYNC SEP
H SHAPE
H DET
V SHAPE
V DET
1
2
3
4
5
6
7
8
9
10
H. STATE
V. STATE
NC
NC
GND
H.SYNC IN
H.SYNC. DET
VSYNC IN
V.SYNC DET
V. TIMING SW

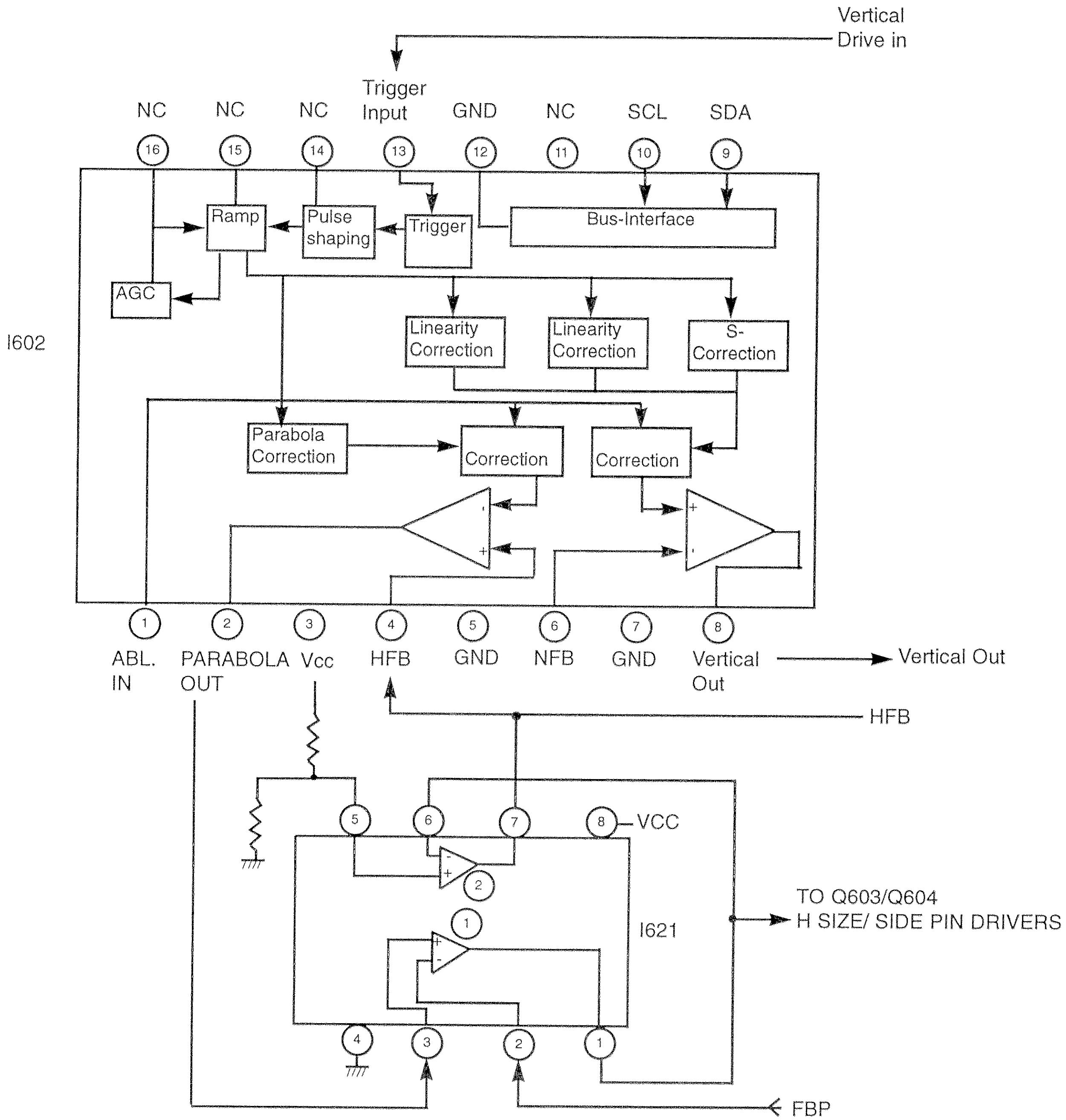
Fig. 8.1 IN01(52347SP) STRUCTURE

9. VERTICAL AND HORIZ. DISTORTION CORRECTION.
(See Fig. 9.)

The vert. drive signal output from IN6A(Sync. switch) is input to I602 pin #13-(TA8859CP- Distortion corrction IC) on the side pin PWB. I602 shapes the vert. sawtooth to a parabola waveform and it is output at pin #2 to I621 pin #3 (NJM2903-Dual OP-AMP) . The FBP(flyback pulse) is also applied to I621 pin#2. This OP-AMP modulates the FBP with the parabola and is output from pin#1 to The H.size /Side Pin drivers Q603, and Q604 to the H. Size PWB.

VERTICAL POSITION ADJUSTMENT.

The vertical position circuit is composed of QVC1, QVC3, and QVC4. The V.cent. output(V) from I004 pin#7 varies the base of QVC1, which changes the DC bias being added to the VDY by QVC3 and QVC4 through RVC5 and RVC6 to change the Vertical position of the picture.



Vertical Drive in
NC
NC
NC
Trigger Input
GND
NC
SCL
SDA
16
15
14
13
12
11
10
9
Ramp
Pulse shaping
Trigger
Bus-Interface
AGC
I602
Linearity Correction
Linearity Correction
S-Correction
Parabola Correction
Correction
Correction
1
2
3
4
5
6
7
8
ABL. IN
PARABOLA OUT
Vcc
HFB
GND
NFB
GND
Vertical Out
Vertical Out
HFB
5
6
7
8
VCC
2
1
I621
TO Q603/Q604 H SIZE/ SIDE PIN DRIVERS
4
3
2
1
FBP

Fig. 9.1: VERTICAL/HORI. DISTORTION CORRECTION

10. HORIZONTAL OUTPUT OPERATION

The Horiz. output, Q702 and the damper D712/D714 perform switching operation to supply the HDY deflection current. When Q702 conducts, the current in the HDY coil increases linear until Q702 is cut-off. The energy stored in the DY decreases , charging the resonance capacitors C713, C71G, C716, and C71M. These capacitors then discharges across the DY coil in a reverse direction. D712 and D714 conducts to supress this reverse voltage. When the damper current becomes zero, Q702 conducts again.

Fig. 10 and 10.1 shows the components which are switched in TV mode and PC mode by relays S701,S702, and S703.

In TV mode, S701 and S702 is closed, and S703 is open, L704 adds inductance, along with L702,L703, C741,C742,C743,C745 R741,R742, AND R743 to control linearity, and H.size, by adjusting Horiz. pulse width and High voltage.

In PC mode, S701, and S702 is open, and S703 is closed. When S703 is closed, it puts a short across L704, L703, C741, C742, C743, R741, R742 cancelling this circuit. Linearity and H.size is then set by L702, R743, C745.
Q756 is made to conduct, adding C71H, and C714 for "S" correction.

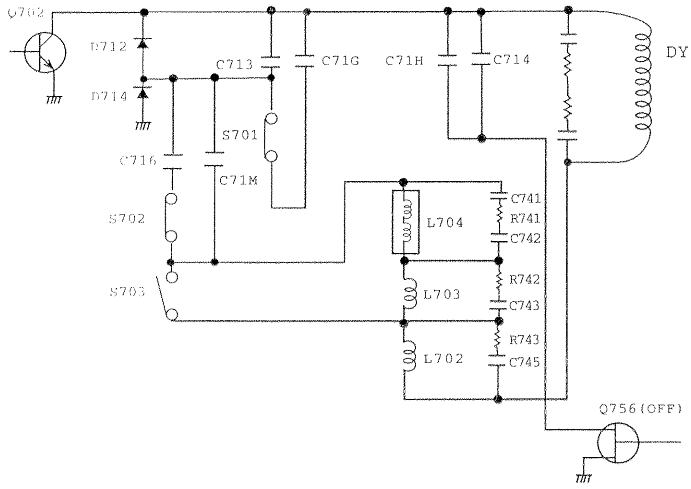

Q702
D712
D714
C713
C71G
C71H
C714
DY
S701
C716
C71M
S702
S703
L704
C741
R741
C742
L703
R742
C743
L702
R743
C745
Q756(OFF)

Fig.10: H.OUT CIRCUIT IN TV MODE

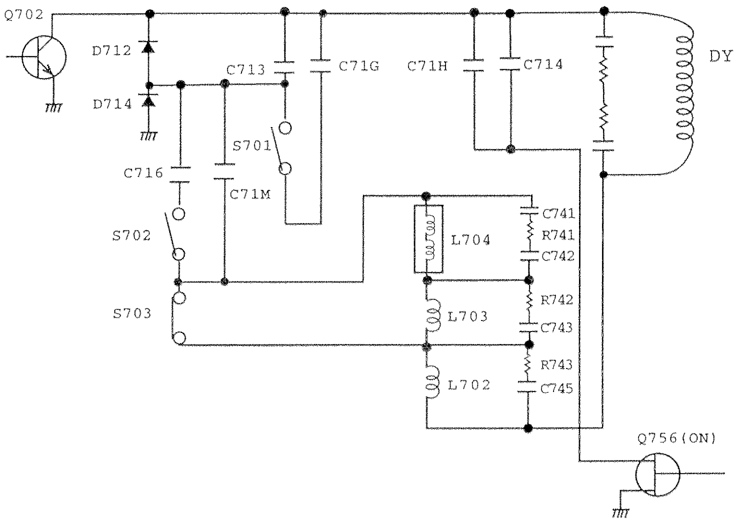

Q702
D712
D714
C713
C71G
C71H
C714
DY
S701
C716
C71M
S702
S703
L704
C741
R741
C742
L703
R742
C743
L702
R743
C745
Q756(ON)

Fig.10.1: H.OUT CIRCUIT IN PC MODE

11. HV regulation/ Raster centering circuit operation.
(see Fig.11)

1. HV regulation: In Pc mode, HV regulation is done by applying the ABL to Q771, Q772 and varying the current in the primary winding of T771 to change the inductance of the secondary to regulate the +B and the HV depending on the brightness of the picture.

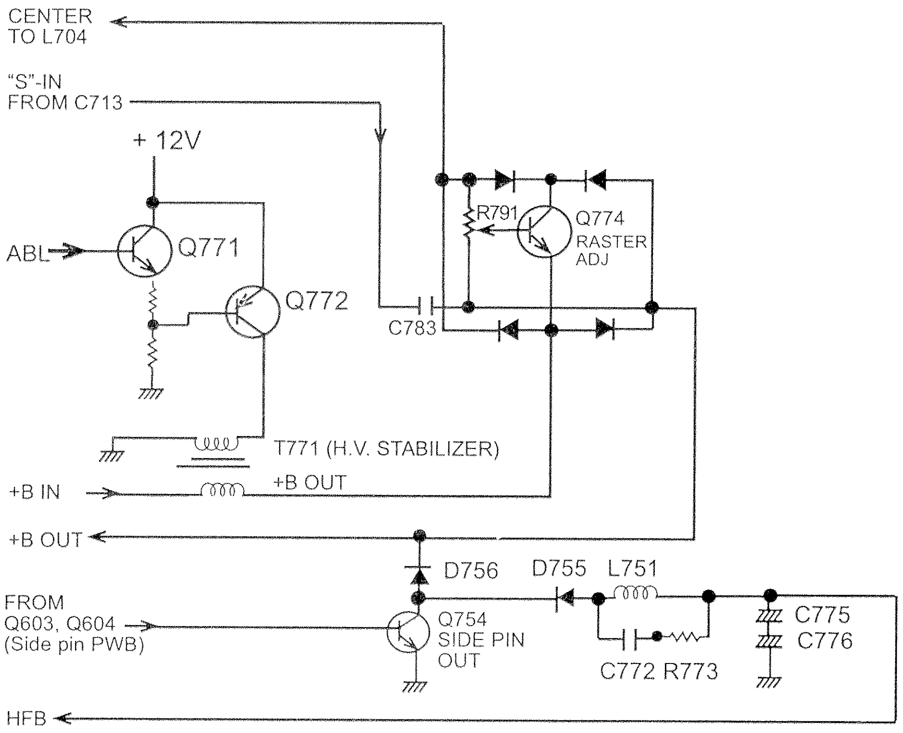
If the picture becomes dark, the ABL voltage increases. Q771 and Q772(B) voltage increases and the current in T771 primary winding drops, increasing the inductance of the secondary winding to bring down the +B and the HV.

If the picture goes bright, the ABL voltage decreases. Q771 and Q772(B) voltage drops and the current in T771 primary winding goes up , reducing the inductance of the secondary winding to raise the +B and the HV.

2. Raster centering circuit: This adjustment is used in PC mode only. In TV mode, Q751 is switched by I001 (TV/PC 4B) to conduct providing a return path for the LED of I751. The photocoupler of I751 also conduct to stop Q774 operation.

In PC mode, Q751 and I751 is off, so Q774 conducts. R791 adjust raster position by changing Q774 (B) voltage. The output voltage flows through D779 to L704 (linearity circuit) in series with H.DY coil to shift the center by changing its bias.

3. Side Pin Output: The output of the side pin drivers Q603,Q604 goes to (B)Q754. Q754(Side pin output) output is a parabola (HFB) modulated by the H and V cycles and applied to the point at C713 and D714 to control the Side pin and the H.size.



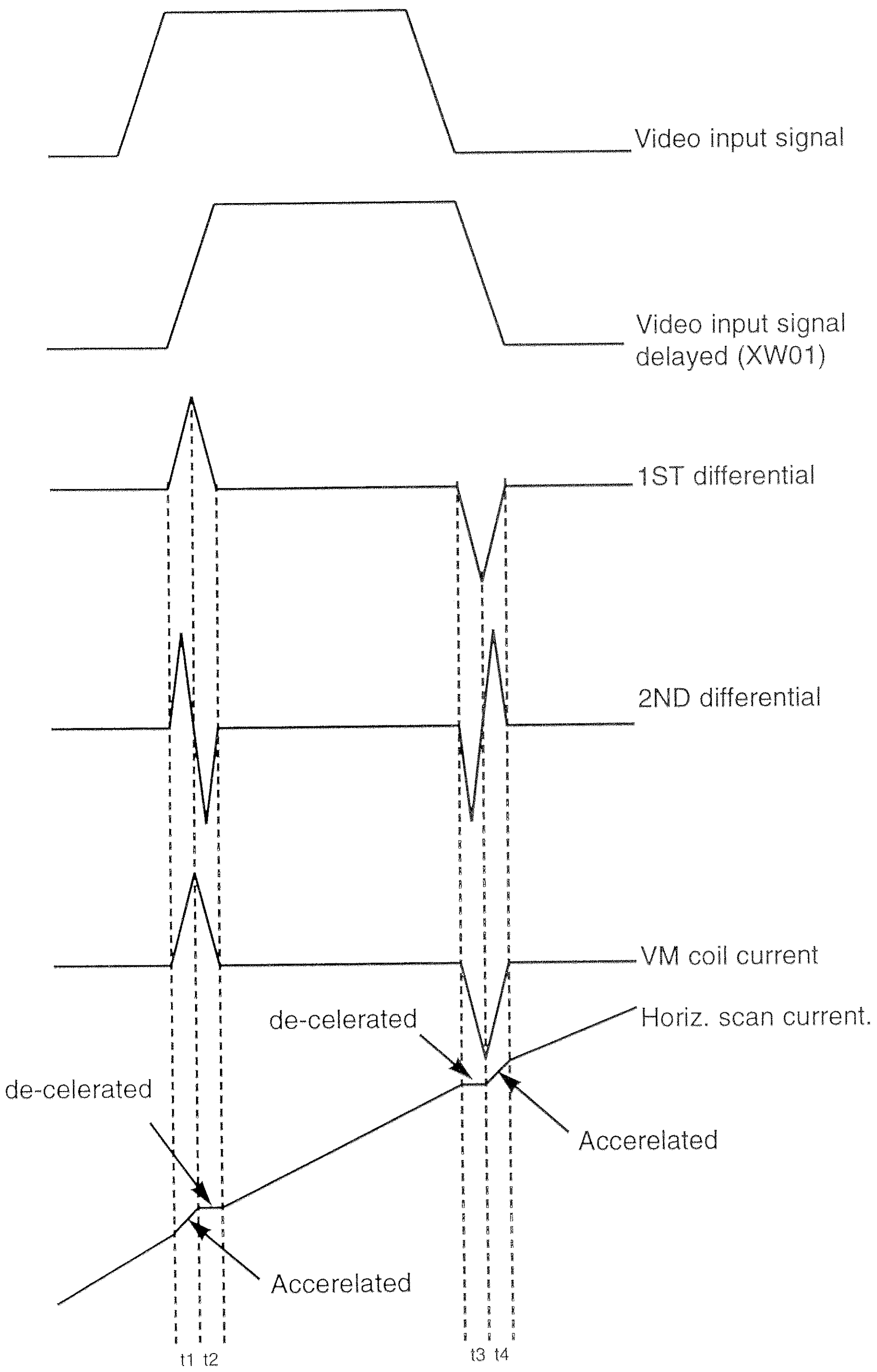
CENTER TO L704
"S"-IN FROM C713
+ 12V
ABL
Q771
Q772
R791
Q774 RASTER ADJ
C783
T771 (H.V. STABILIZER)
+B IN
+B OUT
+B OUT
D756
D755
L751
FROM Q603, Q604 (Side pin PWB)
Q754 SIDE PIN OUT
C772 R773
C775
C776
HFB

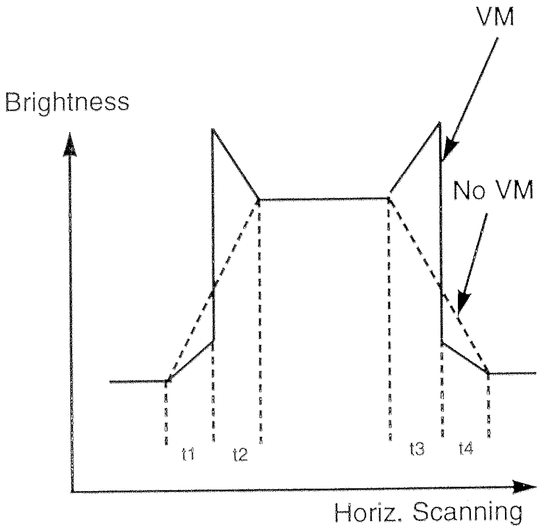
Fig.11: HV REGULATION/RASTER CENTERING/SIDE PIN OUTPUT (H. SIZE PWB)

12. VM CIRCUIT OPERATION

The VM circuit improves the definition between black and white edges by accelerating or decelerating the horiz. scanning speed of the electron beams. As a result, the gradient of the ramp of the leading edge of the luminance signal is increased with the brightness changes and the video bandwidth of the video signal narrowed simultaneously to sharpen the edged.

The Y signal is differentiated by QW03, QW04, QW05, and QW06. The second differential of the Y signal is applied to QW13, VM amplifier, then to the VM drivers, QW07, and QW08. QW09 and QW10 are the VM output amplifiers whigh drive the VM coil. The current applied to the VM coil creates a magnetic field which varies the velocity of the horiz. scanning of the electron beam. QW12 and QW02 are Y buffer and amplifier. The Ys signal is applied to QW11 to cut-off the VM when OSD is diaplayed.


Video input signal
Video input signal delayed (XW01)
1ST differential
2ND differential
VM coil current
de-celerated
Horiz. scan current.
de-celerated
Accerelated
Accerelated
t1 t2
t3 t4


VM
Brightness
No VM
t1
t2
t3
t4
Horiz. Scanning

13: MTS Decoding

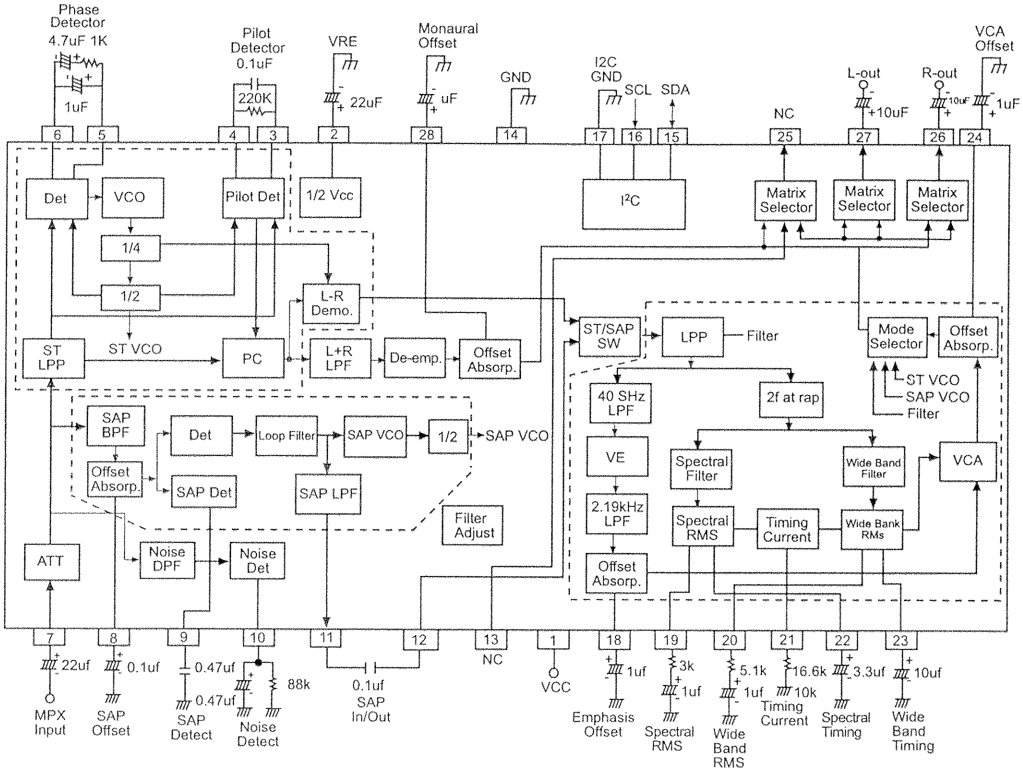

Phase Detector
4.7uF 1K
1uF
Pilot Detector
0.1uF
220K
VRE
22uF
Monaural Offset
uF
GND
I2C GND
SCL
SDA
NC
L-out
+10uF
R-out
10uF
VCA Offset
1uF
6
5
4
3
2
28
14
17
16
15
25
27
26
24
Det
VCO
Pilot Det
1/2 Vcc
I²C
Matrix Selector
Matrix Selector
Matrix Selector
1/4
1/2
L-R Demo.
ST LPP
ST VCO
PC
L+R LPF
De-emp.
Offset Absorp.
ST/SAP SW
LPP
Filter
Mode Selector
Offset Absorp.
ST VCO
SAP VCO
Filter
40 SHz LPF
2f at rap
SAP BPF
Det
Loop Filter
SAP VCO
1/2
SAP VCO
Offset Absorp.
SAP Det
SAP LPF
VE
Spectral Filter
Wide Band Filter
VCA
Filter Adjust
2.19kHz LPF
Spectral RMS
Timing Current
Wide Bank RMs
ATT
Noise DPF
Noise Det
Offset Absorp.
7
8
9
10
11
12
13
1
18
19
20
21
22
23
22uf
0.1uf
0.47uf
0.47uf
88k
0.1uf
NC
VCC
1uf
3k
1uf
5.1k
1uf
16.6k
10k
3.3uf
10uf
MPX Input
SAP Offset
SAP Detect
Noise Detect
SAP In/Out
Emphasis Offset
Spectral RMS
Wide Band RMS
Timing Current
Spectral Timing
Wide Band Timing

Fig. 13. I402 Structure (MPC 1854CT).

I401(uPC1854CT) MTS DECODER OPERATION

1. Stereo Demodulation

The ST-LPF is used to remove the SAP(5fH) and telemetry(6.5fH). The resulting signal is sent to the phase detector. The phase detector convertsit to a DC voltage and filtered by C445, C446 and R448. The 8fH VCO is divided and produces two fH signal, one in phase with the pilot signal and the other 90 degree out of phase.

The signal from the ST-LPF is also sent to the the Pilot Detector which converts it to a Dc voltage and is stabilized by R459 and C447 which is used to determine the ON/OFF condition of the Stereo indicator. The Pilot Cancel cancels the pilot signal by adding the stereo signal with matrix signal at the response level of the input pilot signal. The pilot signal is also sent to the L-R demod. which demodulate the AM-DSB component of the L-R signal and the L-R signal goes to the ST/SAP switch.

The L+R LPF consists of 2 traps tuned to fH and 24Khz to remove the L+R signal and passes through a 75us de-emphasis filter to the mode selector.

2. SAP Demodulation block.

The composite audio signal is also applied to The SAP BPF(peaked to 5fH) to remove the SAP signal. The output of the SAP BPF goes to the SAP DET. It is full wave rectified to a DC voltage and smoothened by the C443 on pin #9. When this DC voltage is reaches a certain level, SAP signal is detected.

The NOISE BPF extracts noise around 11.5fH, and full wave rectified to a DC voltage used to detect noise in weak signal condition to turn-off the SAP indicator. The gain and the time constant are determined R447 and C440.

The SAP demodulation circuit consists of a phase detector, loop filter, and SAP VCO. The Phase detector and the loop filter creates a PLL loop. The VCO 10fH is divided by 2 to obtain the SAP VCO. The SAP LPF eliminates the carrier, and SAP is coupled to the ST/SAP sw by C442.

14. AUDIO SIGNAL PROCESSING.

(See Figs. 14, 14.1, and 14.2)
The audio L and R signals from the MTS decoder IC I402, and the PC L and R signals from the PC input jacks along with the TV-AUX L and R audio are switched by I483(uPD4052C) on the IF/MTS PWB. The L-s and the R-s are the output signals which are sent to the Audio Vol/Tone control IC I SA1(M62420SP) on the Sound PWB.

ISA1 consists of three voltage controlled amplifers per channel. These serves to control Volume, Tone(Bass/Treble) and Surround. It is I2C controlled, and internal switches are used to turn Surround ON or OFF. Tone frequency is set by the external capacitors CS03,CS04,CSA6, AND CSA7.

Audio L and R are output at pins#14, and 7 to preamps QA01,QA02,QA03,QA04 to provide external HIFI audio outputs. Muting is done by Q461 and Q462 for L and R output. The L and R signals are also sent to the Audio output IC I403 (LA4613) on the main PWB.

This IC consist of input anp., driver amp., and output amp. per channel. The audio signals are amplified and output at pins#3(L), and pin#1(R). Internal speakers are turned ON/OFF by Q411 controlled by the main uPC I001.

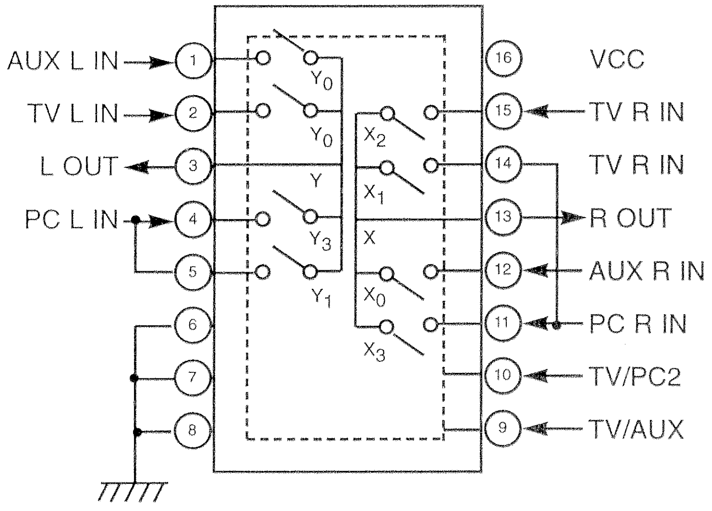

AUX L IN
TV L IN
L OUT
PC L IN
1
2
3
4
5
6
7
8
Y_0
Y_0
Y
Y_3
Y_1
X_2
X_1
X
X_0
X_3
16
15
14
13
12
11
10
9
VCC
TV R IN
TV R IN
R OUT
AUX R IN
PC R IN
TV/PC2
TV/AUX

Fig. 13.
AUDIO SWITCHING I483 (uPD4052C)

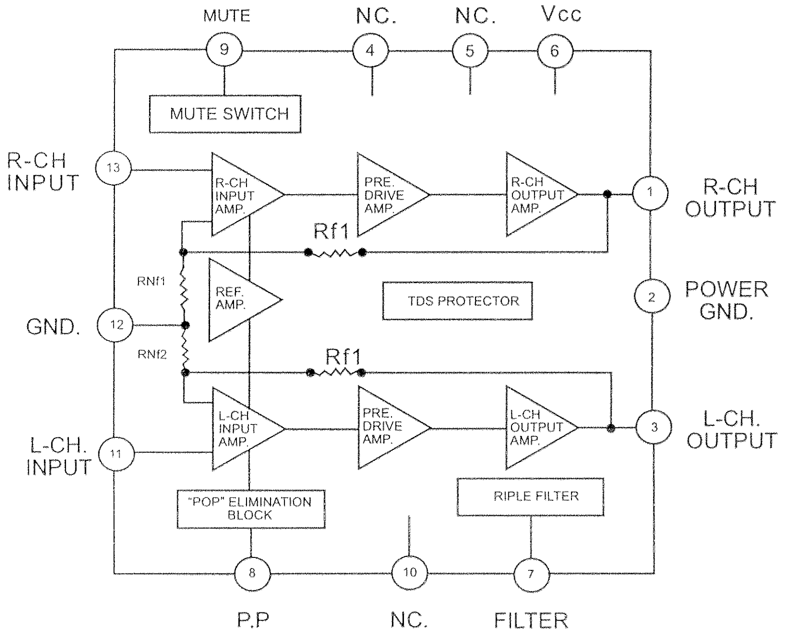

MUTE
NC.
NC.
Vcc
9
4
5
6
MUTE SWITCH
R-CH INPUT
13
R-CH INPUT AMP.
PRE. DRIVE AMP.
R-CH OUTPUT AMP.
1
R-CH OUTPUT
Rf1
RNf1
REF. AMP.
TDS PROTECTOR
2
POWER GND.
GND.
12
RNf2
Rf1
L-CH. INPUT
11
L-CH INPUT AMP.
PRE. DRIVE AMP.
L-CH OUTPUT AMP.
3
L-CH. OUTPUT
"POP" ELIMINATION BLOCK
RIPLE FILTER
8
10
7
P.P
NC.
FILTER

Fig. 13.1
AUDIO OUTPUT I403 LA4613)

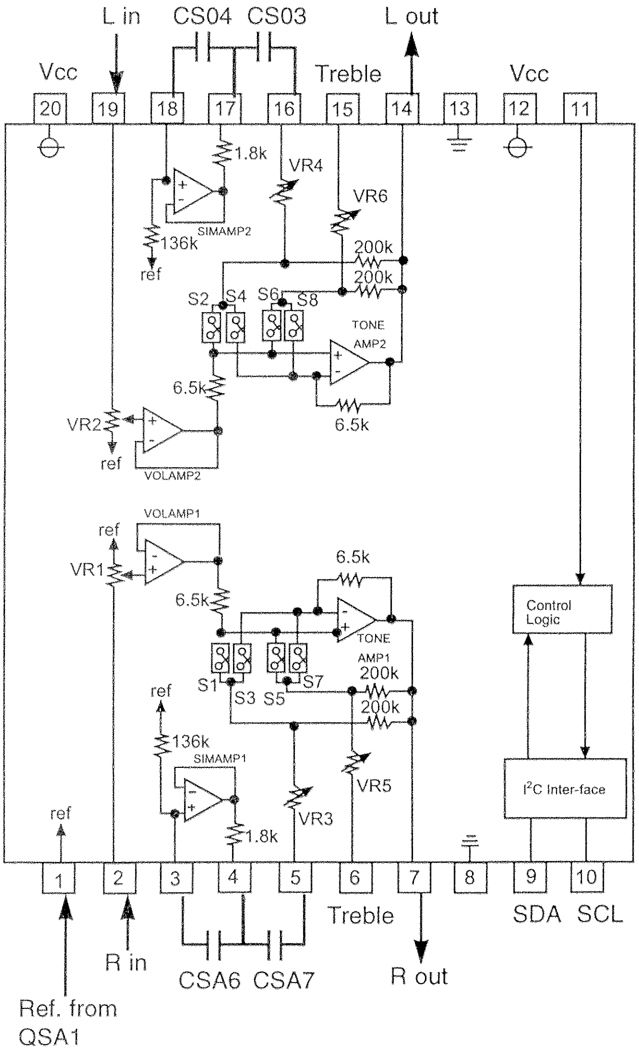

L in
CS04
CS03
L out
Vcc
Treble
Vcc
20
19
18
17
16
15
14
13
12
11
1.8k
VR4
VR6
SIMAMP2
136k
ref
200k
200k
S2
S4
S6
S8
TONE AMP2
6.5k
6.5k
VR2
ref
VOLAMP2
VOLAMP1
ref
VR1
6.5k
6.5k
TONE AMP1
200k
200k
S1
S3
S5
S7
ref
136k
SIMAMP1
VR5
VR3
1.8k
ref
Control Logic
I²C Inter-face
1
2
3
4
5
6
7
8
9
10
Treble
SDA
SCL
R in
CSA6
CSA7
R out
Ref. from QSA1

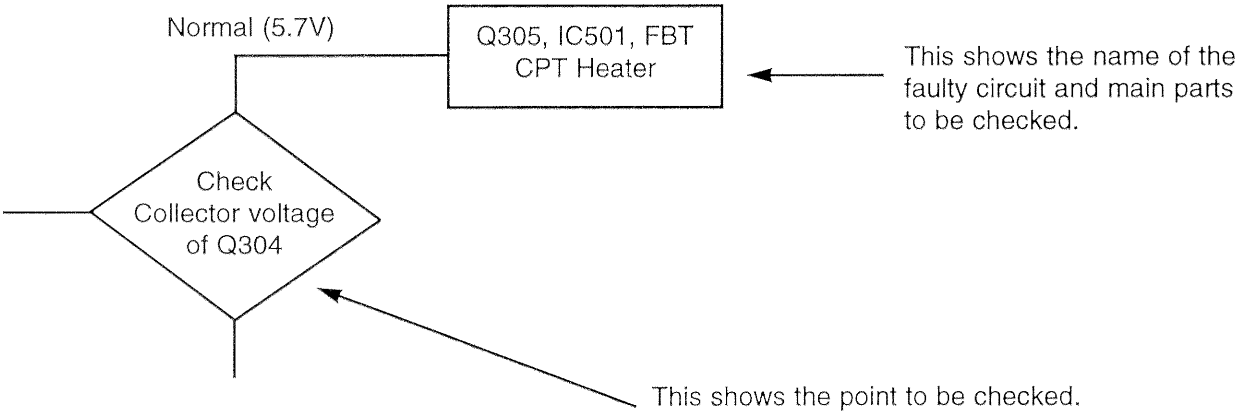
Fig. 13.2
AUDIO PRE-AMP. ISA1(M62420SP)

PRODUCT SAFETY NOTE

The shaded and ⚠ marked components have special characteristics important to safety. Read carefully the product safety notice of each service manual. Don't degrade the safety of the receiver through improper servicing when replacing any of this components.

HOW TO USE THE FLOW CHART

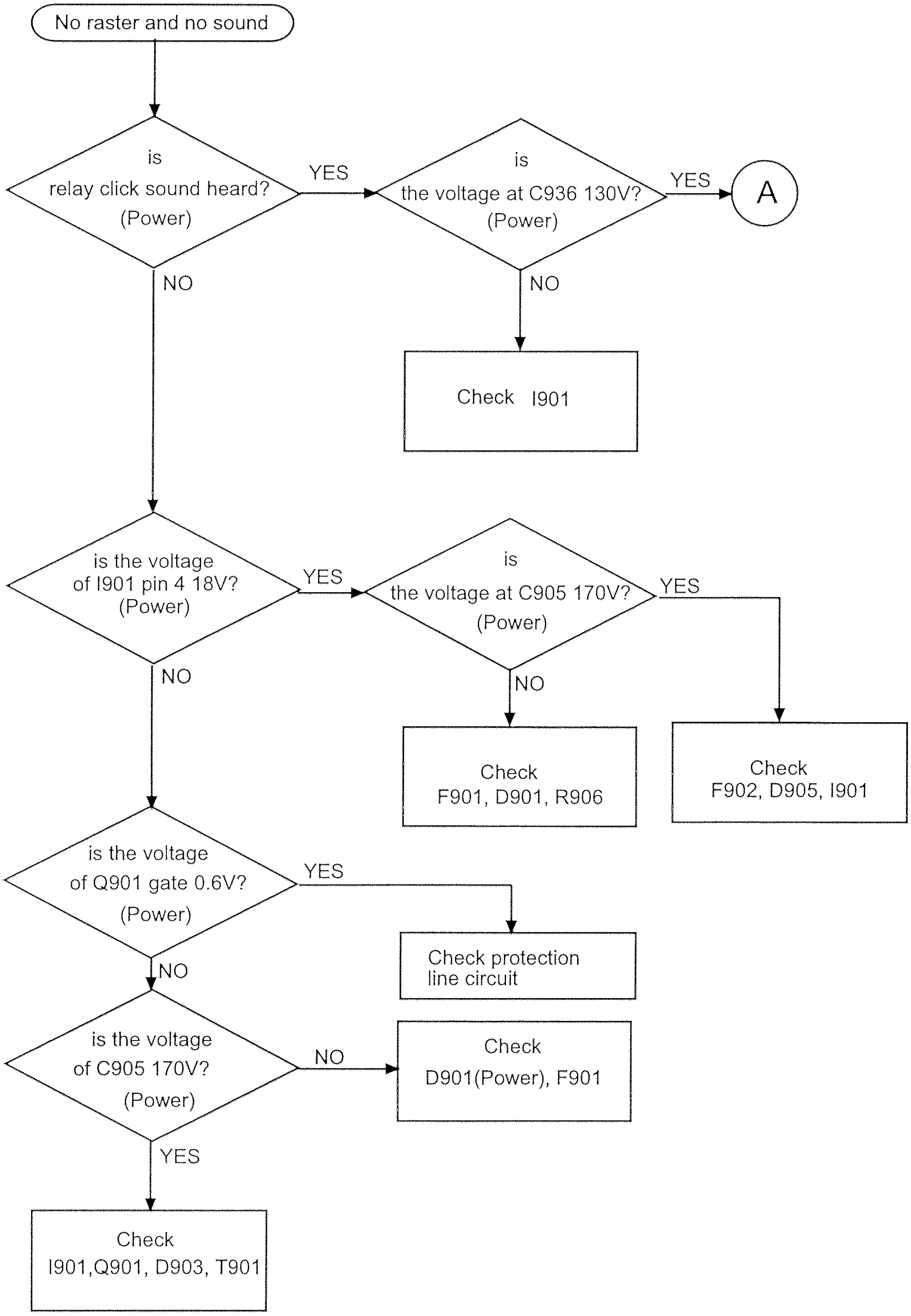
(1) The flow chart shows the following:

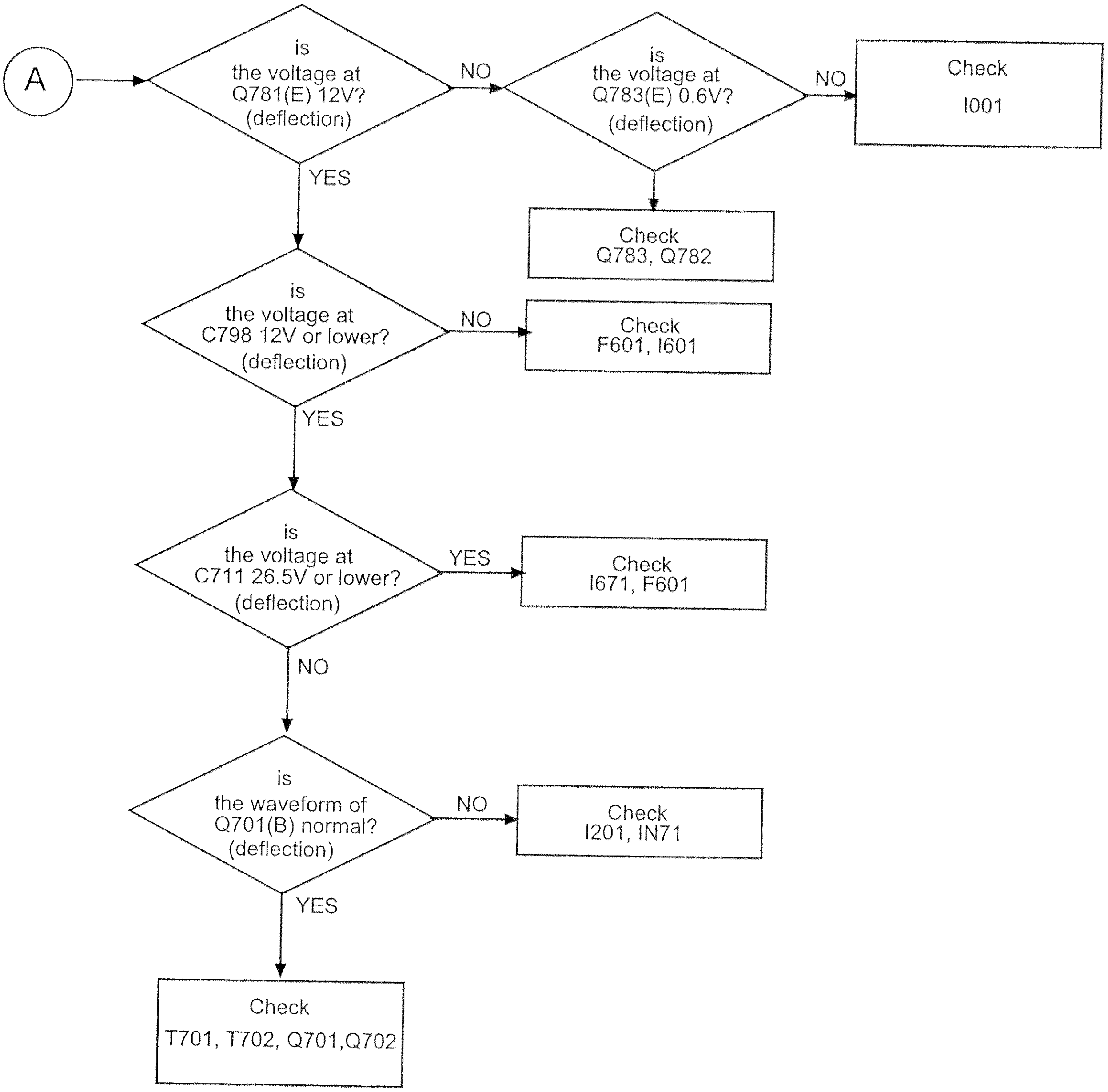

Normal (5.7V)
Q305, IC501, FBT
CPT Heater
This shows the name of the faulty circuit and main parts to be checked.
Check
Collector voltage
of Q304
This shows the point to be checked.

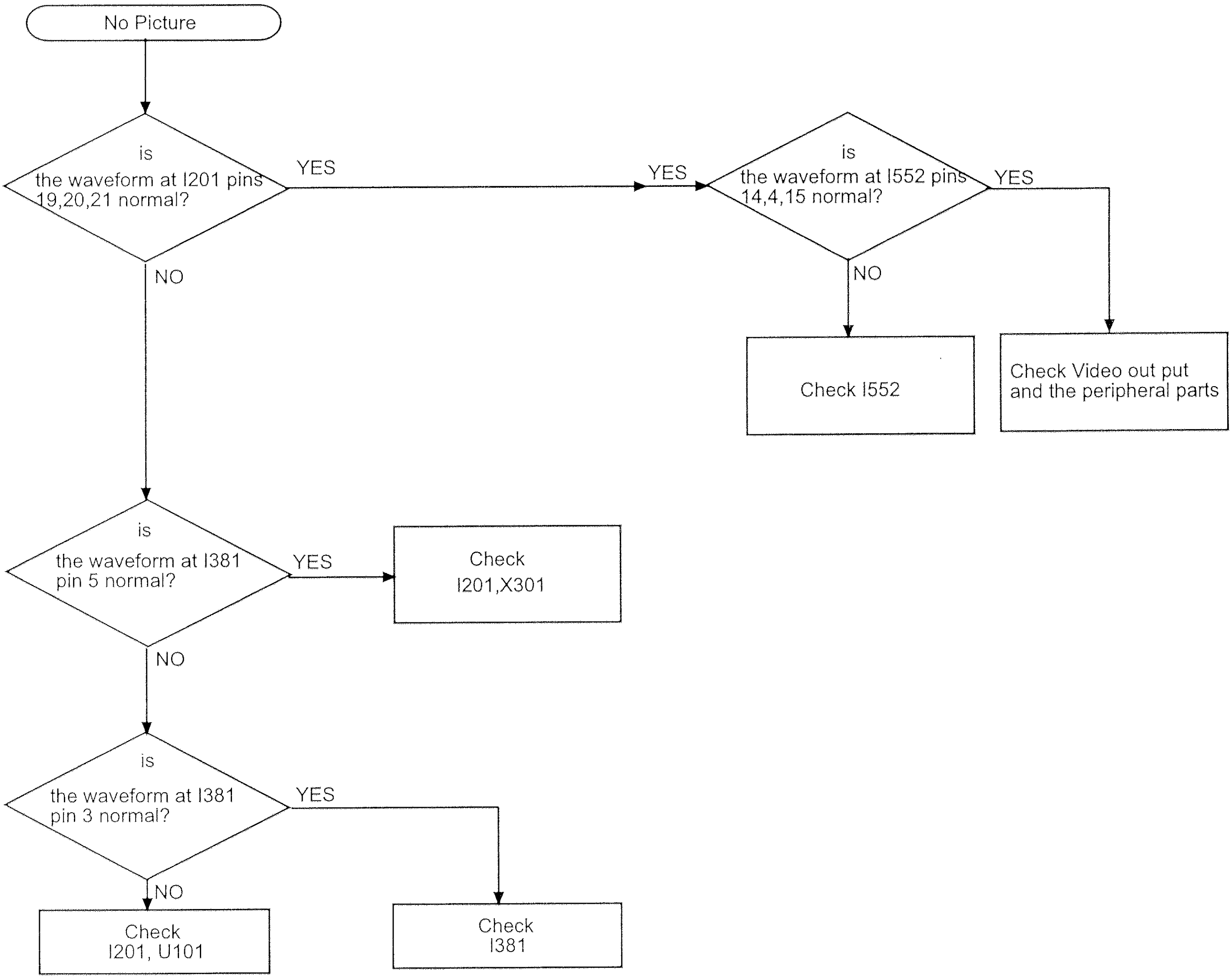
(2) The voltage shown in the chart may differ to some extent depending on the condition of the set and tester.

PRECAUTION ON MAKING MEASUREMENTS AND ON HANDLING

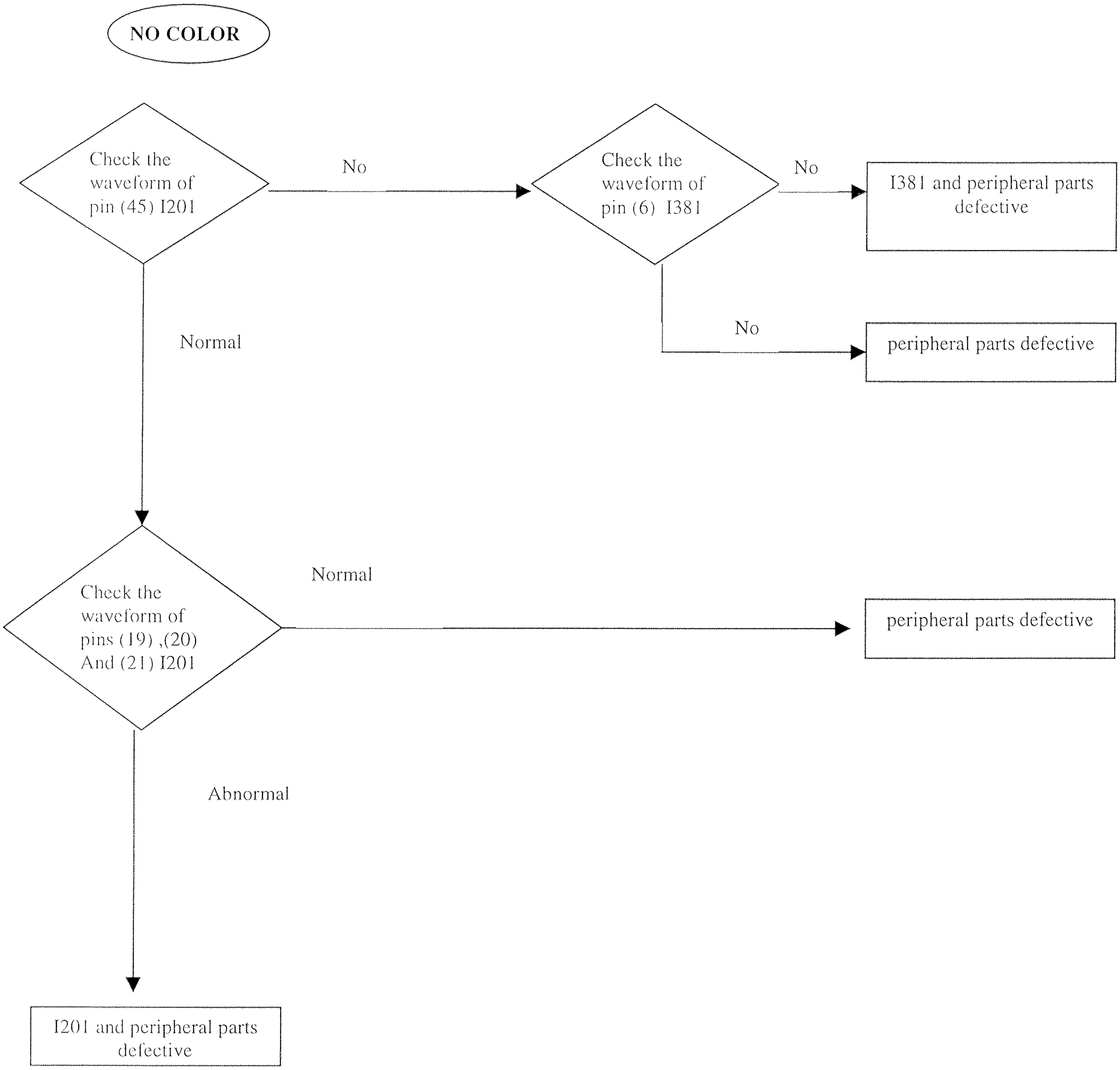
1. When any parts become abnormally hot or there is a smell of burning, cut off the power immediately.
2. Do not make shorts between circuits or across terminals except for those specified.
3. When measuring the voltages of ICs and TRs, be careful that the test lead of the tester does not touch any other terminal.
4. Measure the voltage correctly.
5. Measure the resistance over a small range.
6. Be sure to switch off the power when replacing parts.
7. Do not apply a soldering iron for a long time when replacing parts. (Use a solder-wick.)
8. Use an isolation transformer when troubleshooting.


No raster and no sound
is relay click sound heard? (Power)
YES
is the voltage at C936 130V? (Power)
YES
A
NO
Check I901
NO
is the voltage of I901 pin 4 18V? (Power)
YES
is the voltage at C905 170V? (Power)
YES
NO
Check F901, D901, R906
Check F902, D905, I901
NO
is the voltage of Q901 gate 0.6V? (Power)
YES
Check protection line circuit
NO
is the voltage of C905 170V? (Power)
NO
Check D901(Power), F901
YES
Check I901,Q901, D903, T901


A
is the voltage at Q781(E) 12V? (deflection)
NO
is the voltage at Q783(E) 0.6V? (deflection)
NO
Check I001
Check Q783, Q782
YES
is the voltage at C798 12V or lower? (deflection)
NO
Check F601, I601
YES
is the voltage at C711 26.5V or lower? (deflection)
YES
Check I671, F601
NO
is the waveform of Q701(B) normal? (deflection)
NO
Check I201, IN71
YES
Check T701, T702, Q701,Q702

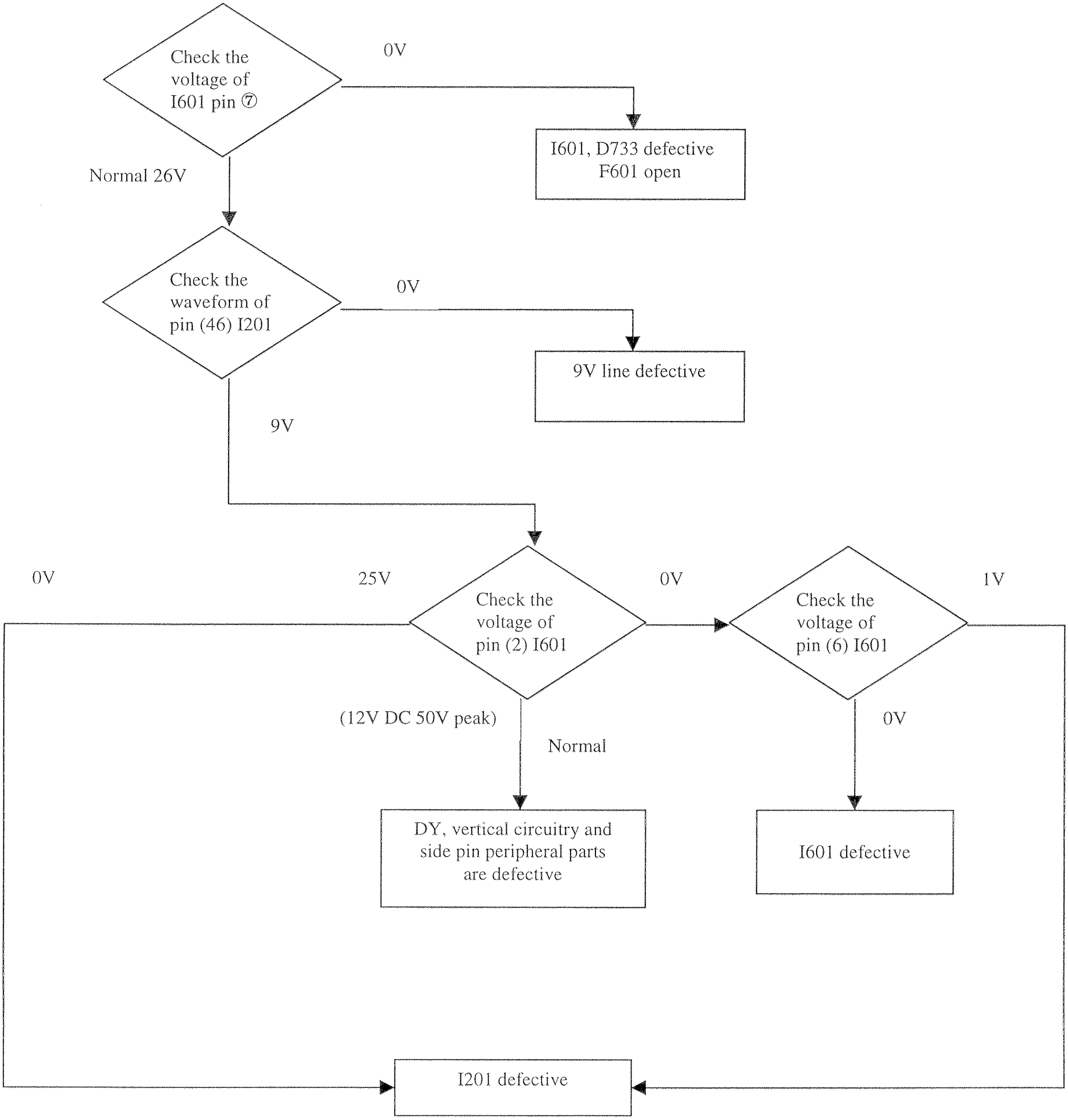

No Picture
is the waveform at I201 pins 19,20,21 normal?
YES
YES
is the waveform at I552 pins 14,4,15 normal?
YES
NO
Check I552
Check Video out put and the peripheral parts
NO
is the waveform at I381 pin 5 normal?
YES
Check I201,X301
NO
is the waveform at I381 pin 3 normal?
YES
NO
Check I201, U101
Check I381

TROUBLESHOOTING

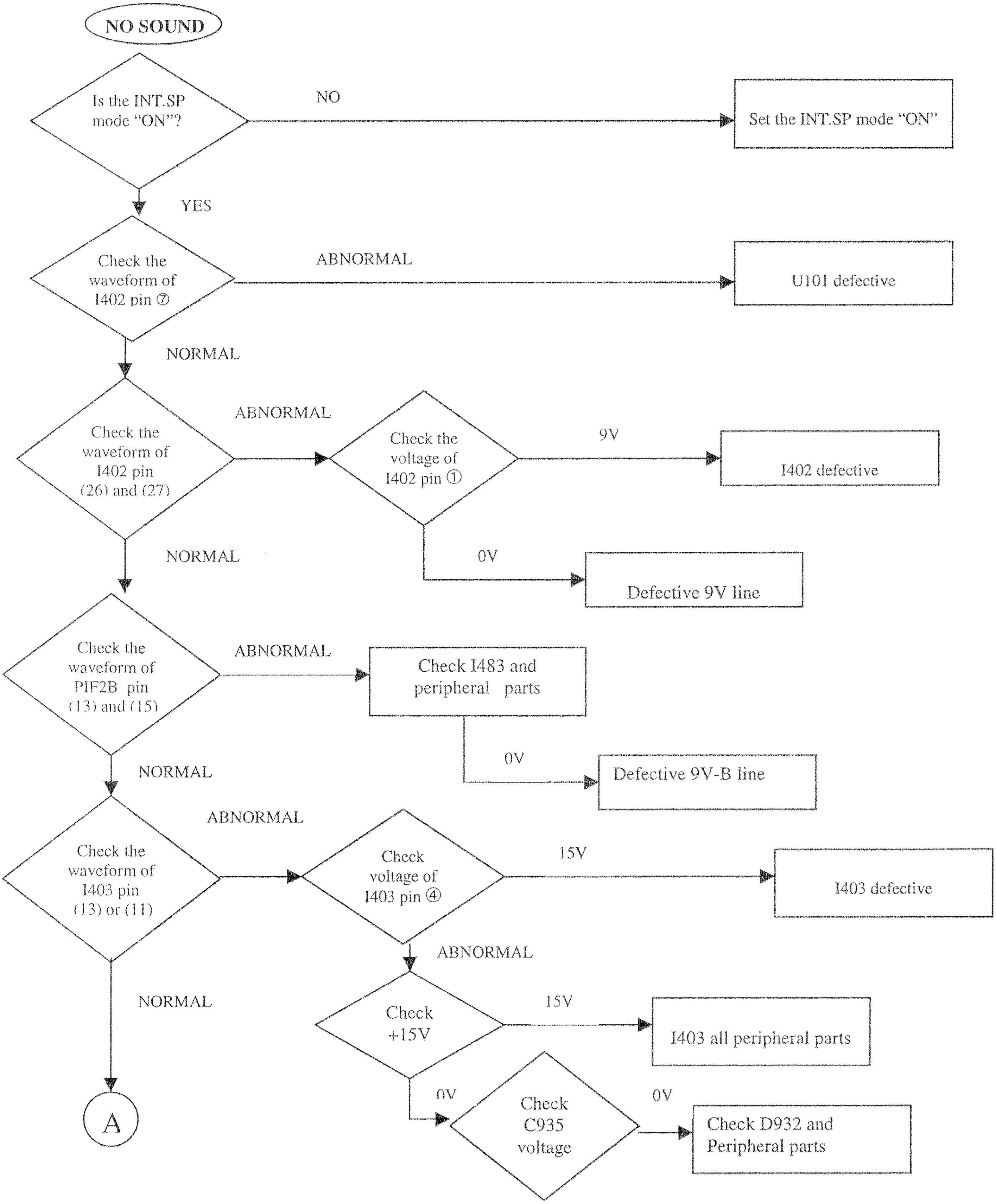

NO COLOR
Check the waveform of pin (45) I201
No
Check the waveform of pin (6) I381
No
I381 and peripheral parts defective
No
peripheral parts defective
Normal
Check the waveform of pins (19) ,(20) And (21) I201
Normal
peripheral parts defective
Abnormal
I201 and peripheral parts defective

TROUBLESHOOTING

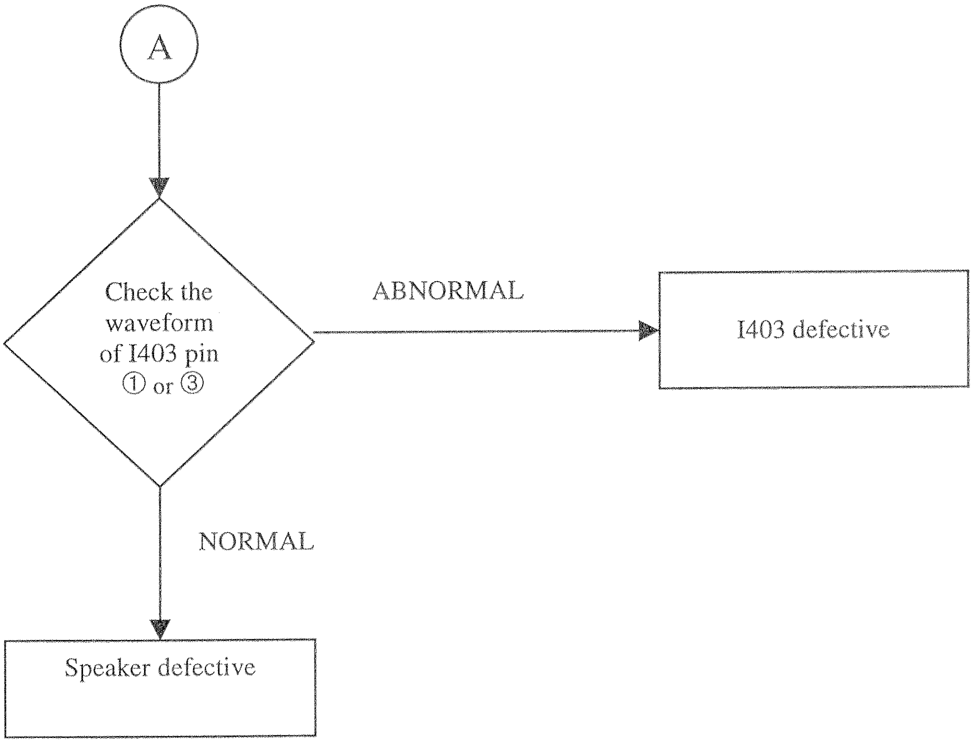
NO VERTICAL DEFECTION OR V. SIZE IS DISTORTED


Check the voltage of I601 pin ⑦
0V
I601, D733 defective F601 open
Normal 26V
Check the waveform of pin (46) I201
0V
9V line defective
9V
0V
25V
Check the voltage of pin (2) I601
0V
Check the voltage of pin (6) I601
1V
(12V DC 50V peak)
Normal
0V
DY, vertical circuitry and side pin peripheral parts are defective
I601 defective
I201 defective

TROUBLESHOOTING

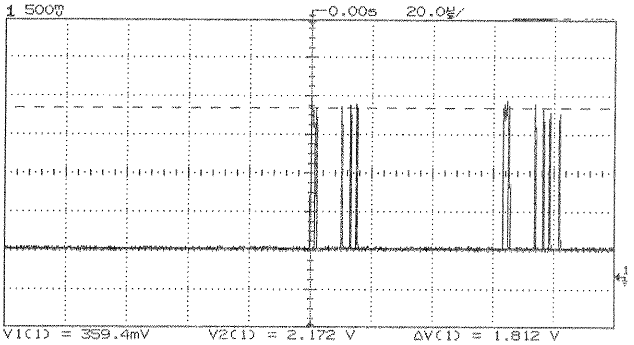

NO SOUND
Is the INT.SP mode "ON"?
NO
Set the INT.SP mode "ON"
YES
Check the waveform of I402 pin ⑦
ABNORMAL
U101 defective
NORMAL
Check the waveform of I402 pin (26) and (27)
ABNORMAL
Check the voltage of I402 pin ①
9V
I402 defective
0V
Defective 9V line
NORMAL
Check the waveform of PIF2B pin (13) and (15)
ABNORMAL
Check I483 and peripheral parts
0V
Defective 9V-B line
NORMAL
Check the waveform of I403 pin (13) or (11)
ABNORMAL
Check voltage of I403 pin ④
15V
I403 defective
ABNORMAL
Check +15V
15V
I403 all peripheral parts
0V
Check C935 voltage
0V
Check D932 and Peripheral parts
NORMAL
A

TROUBLESHOOTING

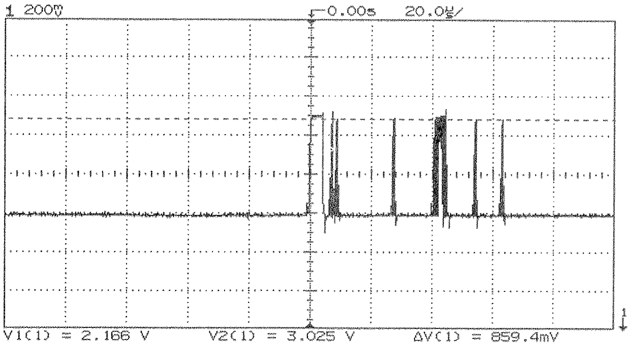

A
Check the waveform of I403 pin ① or ③
ABNORMAL
I403 defective
NORMAL
Speaker defective

Waveforms

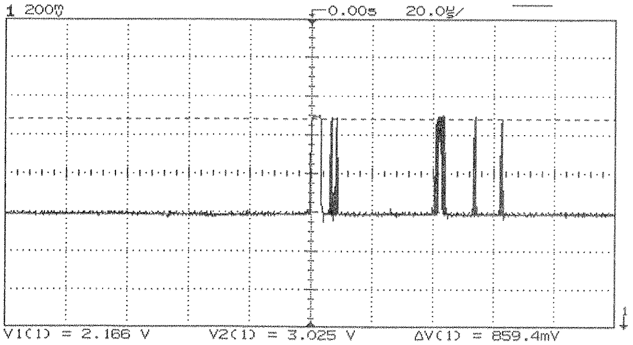
① PIF1B pin#7- OSD BLK



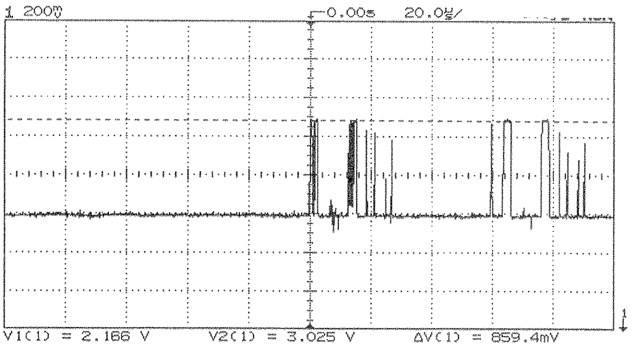
② PIF1B pin#8- OSD RED



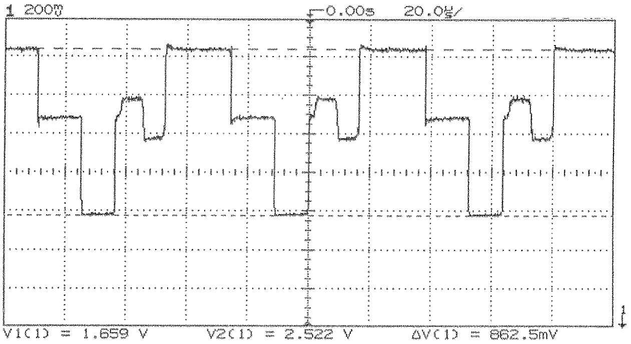
③ PIF1B pin#9- OSD GREEN



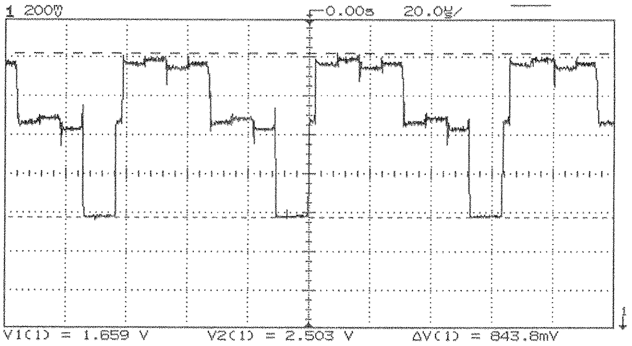
④ PIF1B pin#10- OSD BLUE



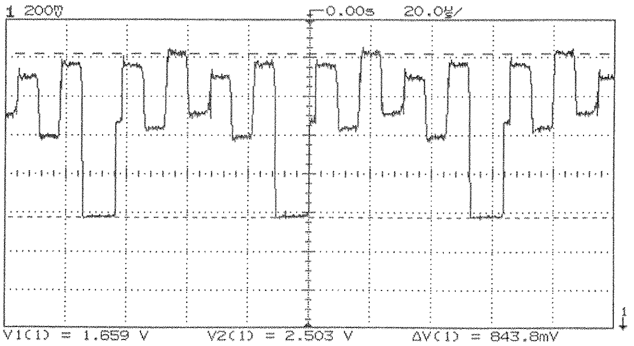
⑤ PIF1B pin#11- RED OUT



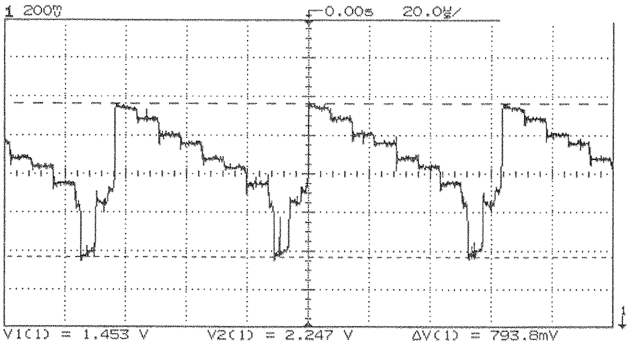
⑥ PIF1B pin#12- GREEN OUT



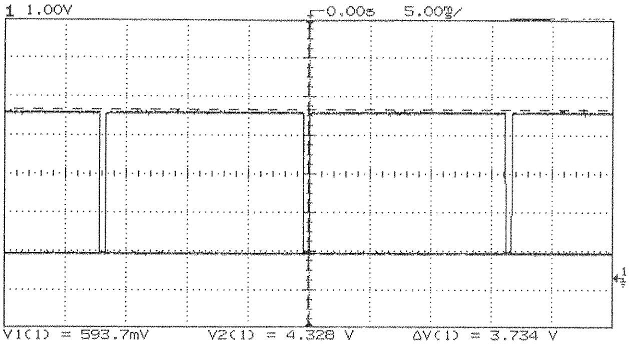
⑦ PIF1B pin#13- BLUE OUT



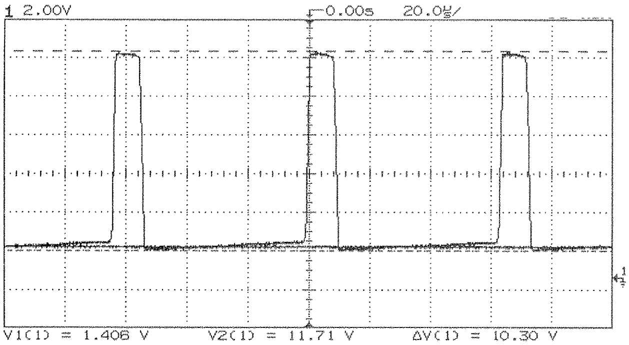
⑧ PIF2B pin#1-Y-IN(COMB)



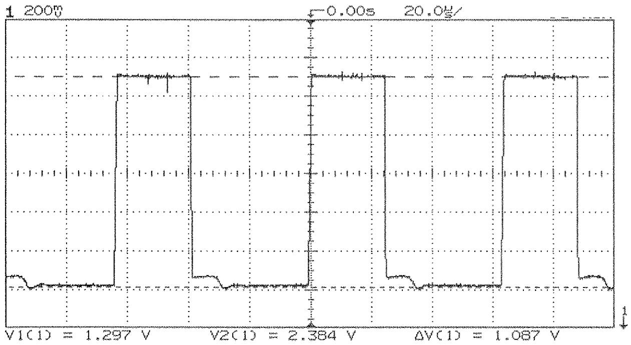
⑨ PIF1B pin#6- V.RAMP



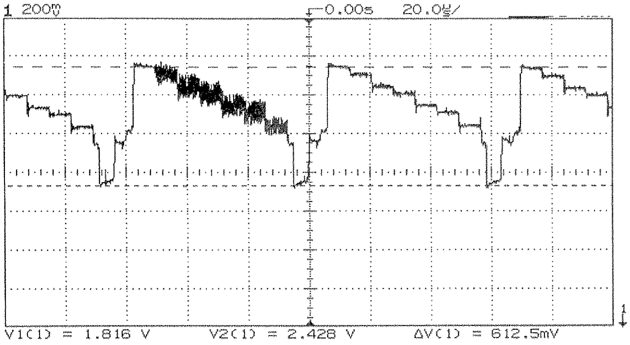
⑩ PIF3B pin#12- FBP



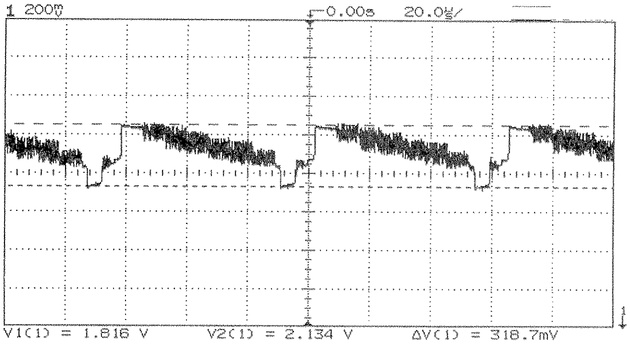
⑪ PIF3B pin#13- H. OUT



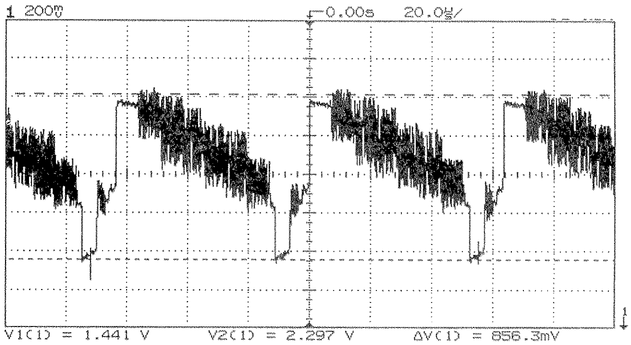
⑫ PIF3B pin#15- VIDEO-CCD



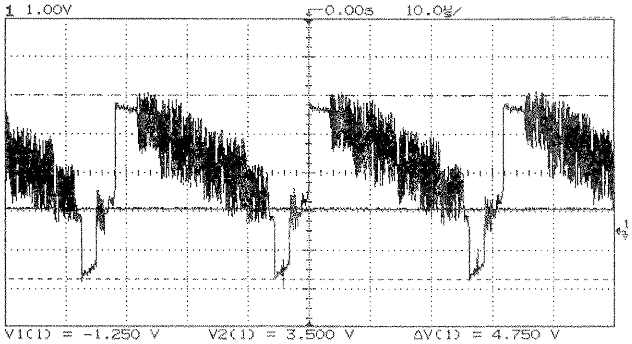
⑬ PIF2B pin# 3- CHROMA IN



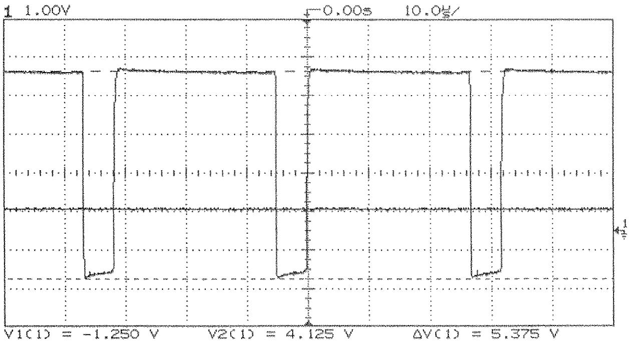
⑭ PIF2B pin# 5- TV VIDEO



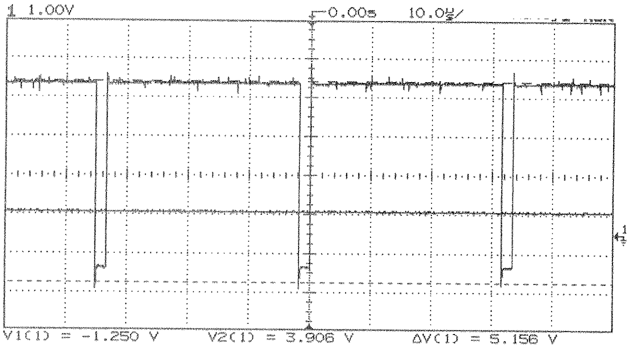
⑮ I381 pin#5-VIDEO OUT



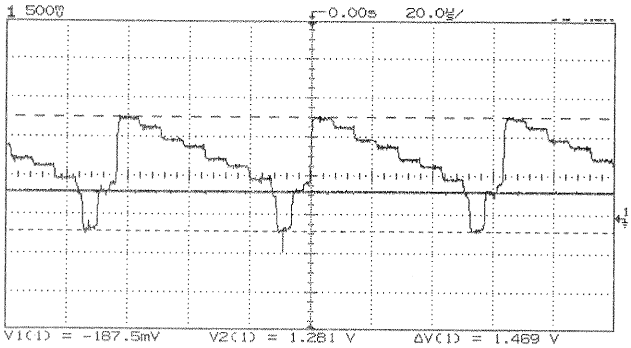
⑯ I001 pin# 1-H.SYNC.



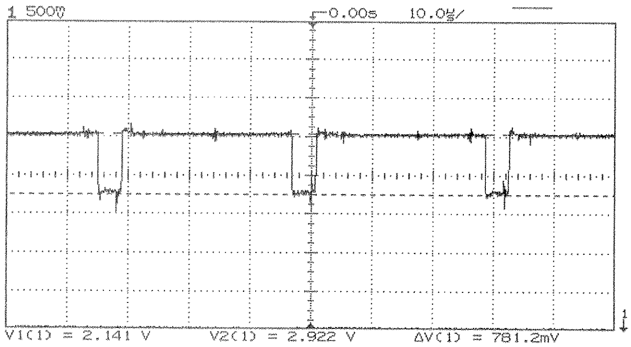
⑰ I001 pin#2-V.SYNC.



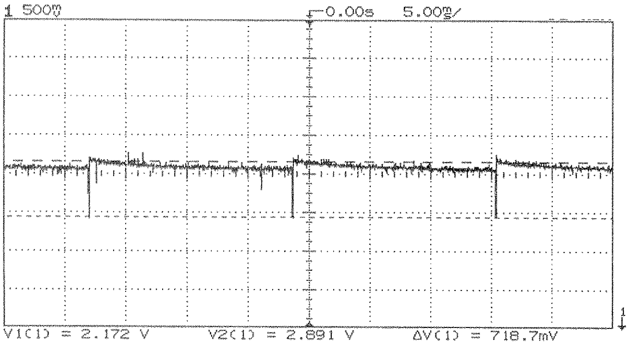
⑱ I001 pin#22-CCD-Vin



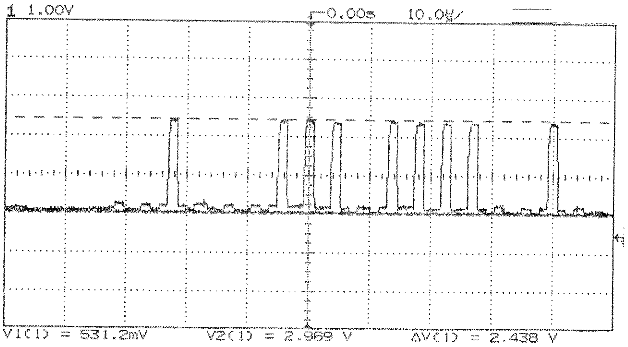
⑲ IN01 pin#6- PC-H (PC mode)



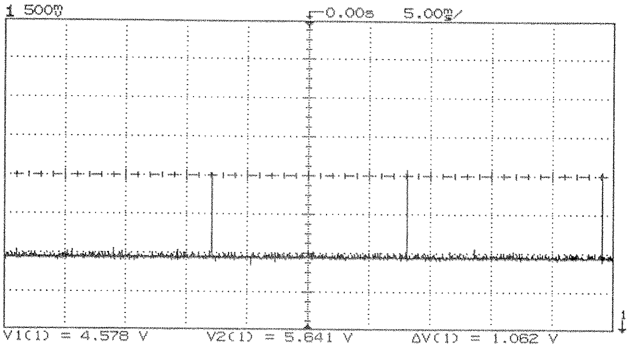
⑳ IN01 pin#8-PC-V (PC mode)



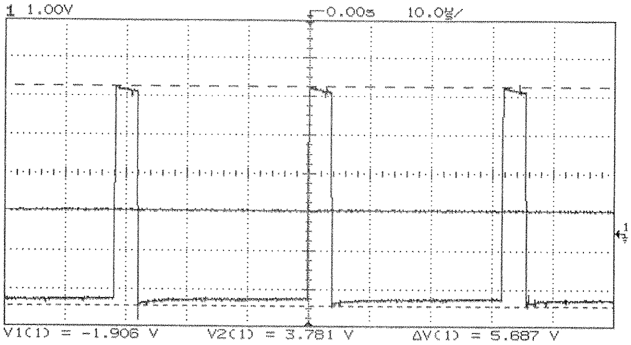
㉑ IN01 pin# 1-H-STATE(PC mode)



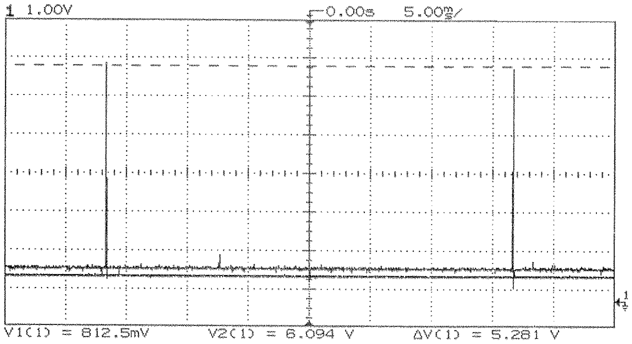
㉒ IN01 pin# 2-V-STATE(PC mode)



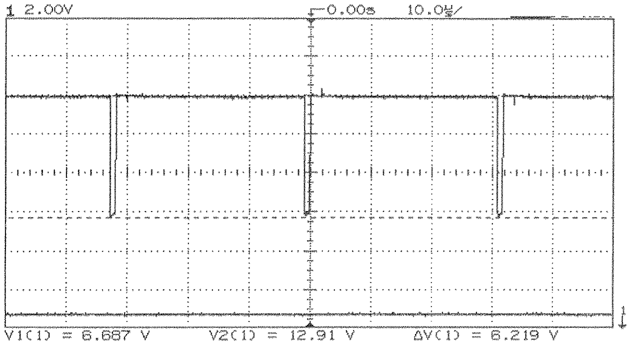
㉓ IN01 pin#14-HD-OUT(PC mode)



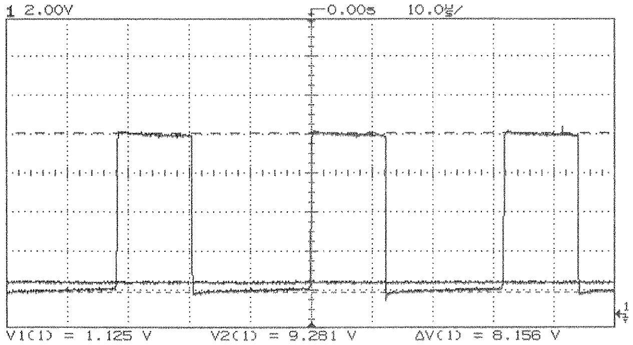
㉔ IN01 pin#13-VD-OUT(PC mode)



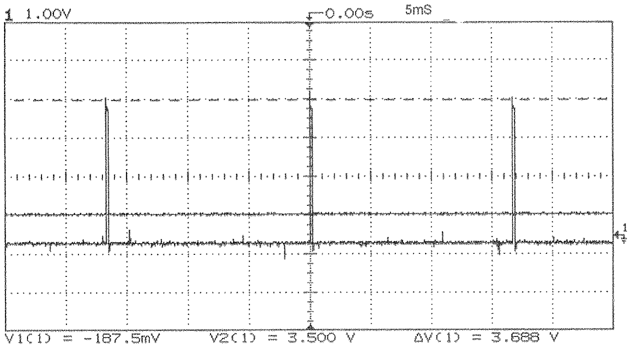
㉕ IN71 pin# 10-H. SYNC. in(PC mode)



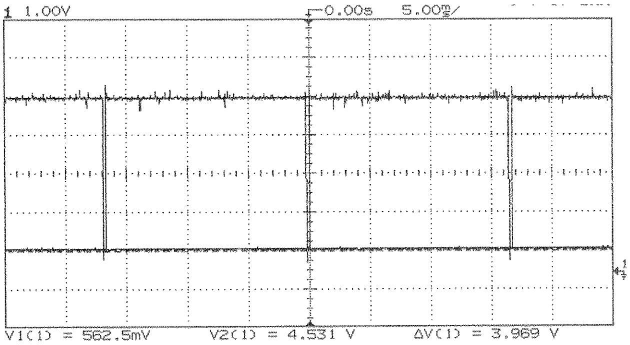
㉖ IN71 pin # 15-H.SYNC. out(PC mode)



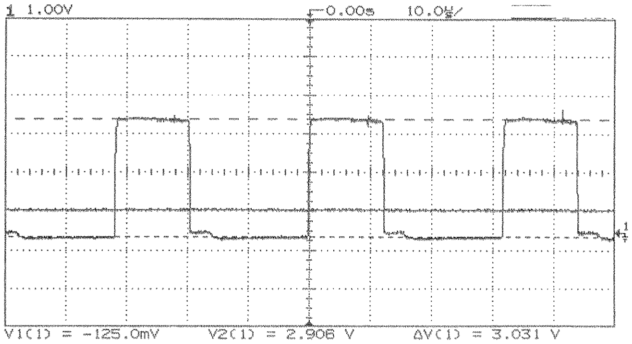
㉗ IN71 pin # 6-V.SYNC. out(PC mode)



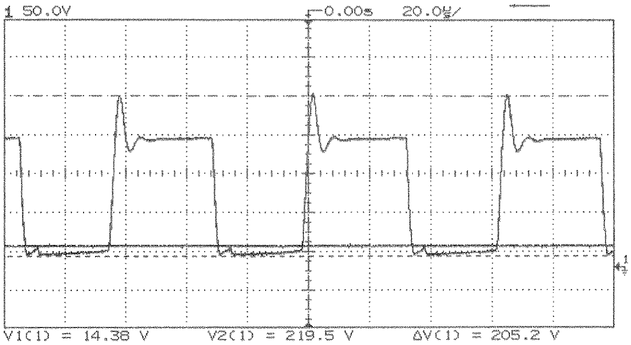
㉘ IN6A pin # 4-V.DRIVE. (PC mode)



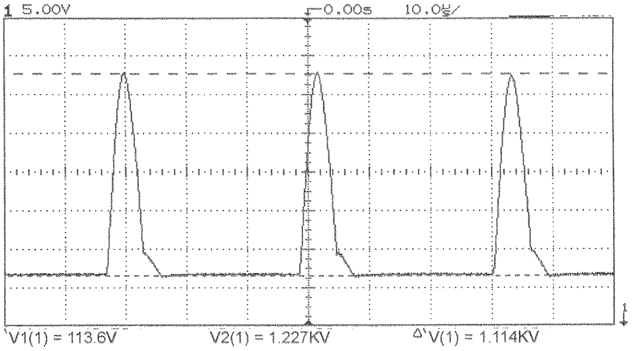
㉙ IN6A pin # 14-H.DRIVE. (PC mode)



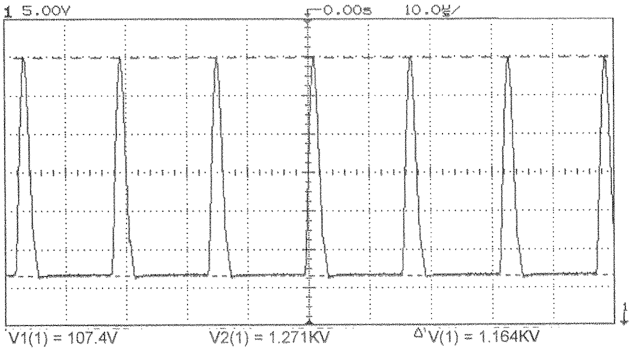
㉚ Q701(C) H.DRIVE OUT



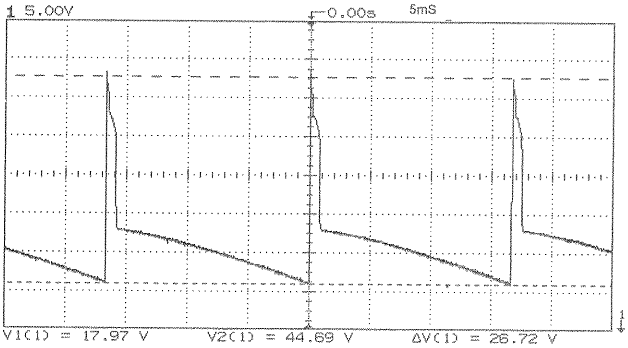
㉛ Q702(C) H. OUT-TV



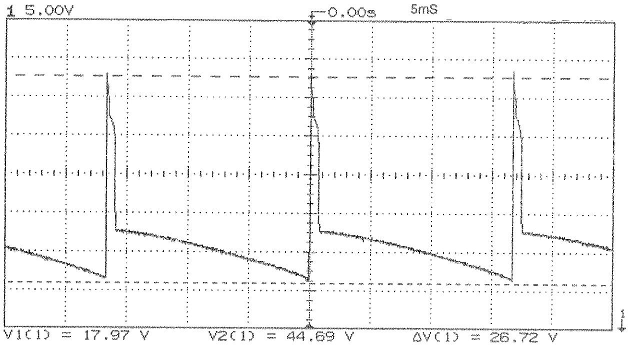
㉜ Q702(C) H. OUT-PC



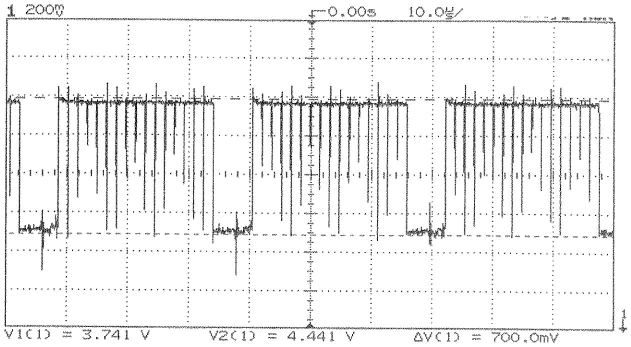
㉝ I601 pin# 2-V.OUT(TV)



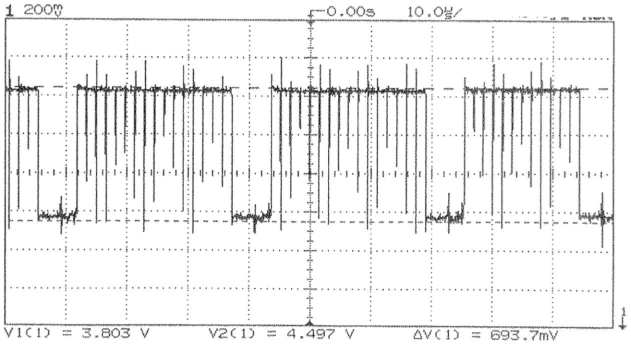
㉞ I601 pin# 2-V.OUT(PC)



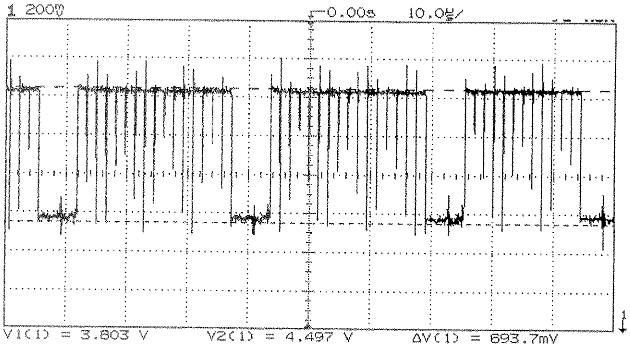
㉟ EX2A pin# 2-PC Blue



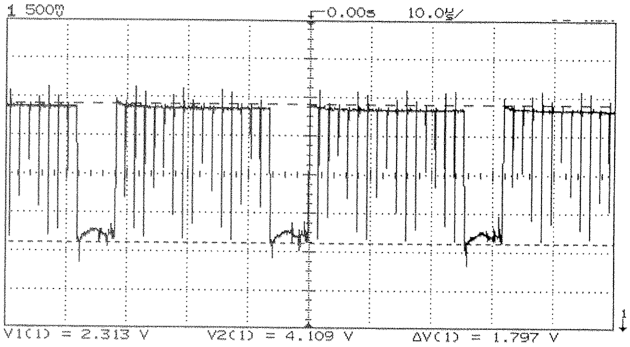
㊱ EX2A pin# 4-PC Green



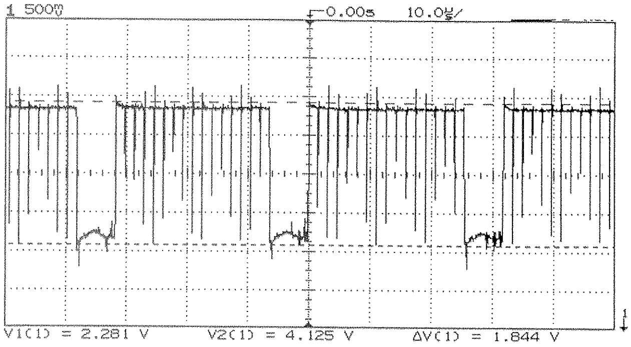
㊲ EX2A pin# 6-PC Red



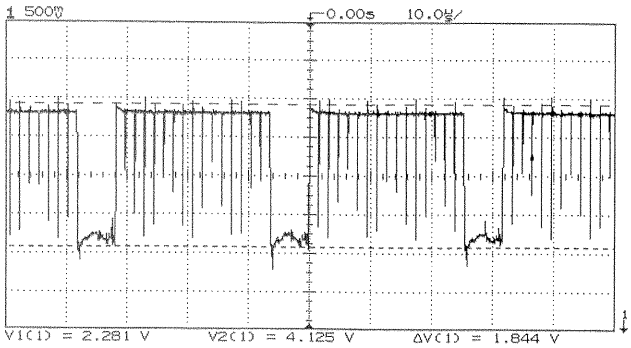
㊳ PJIG pin# 1-PC-Red OUT



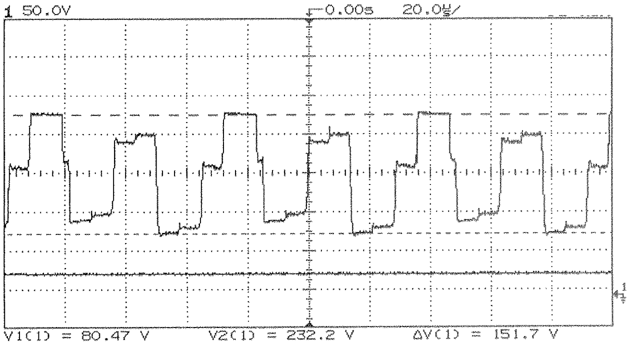
㊴ PJIG pin# 2-PC-Green OUT



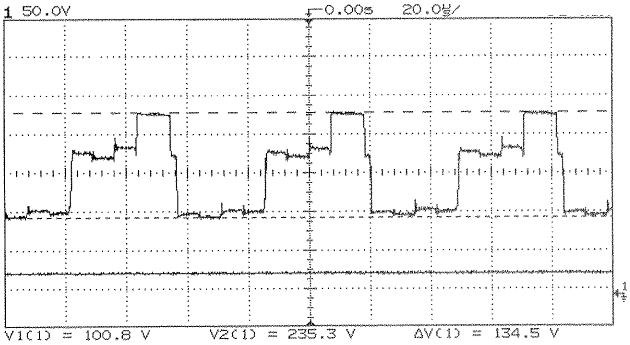
㊵ PJIG pin# 1-PC-Blue OUT



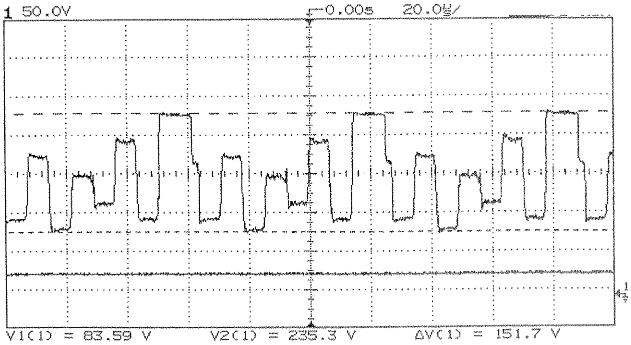
㊶ Q851(C) Red VIDEO OUT



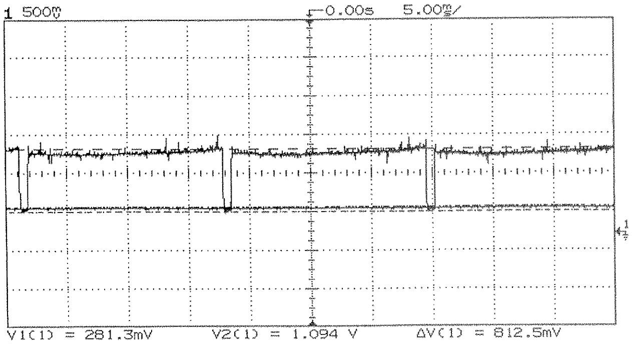
㊷ Q854(C) Green VIDEO OUT



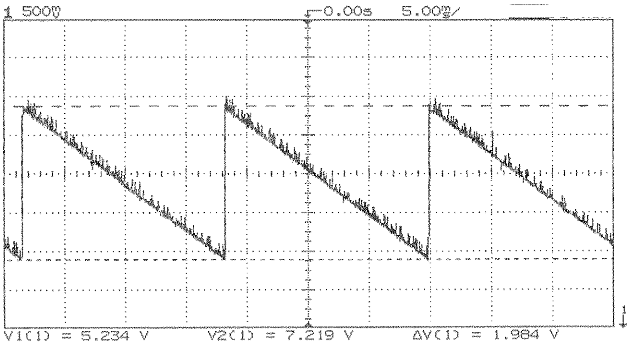
㊸ Q857(C) Blue VIDEO OUT



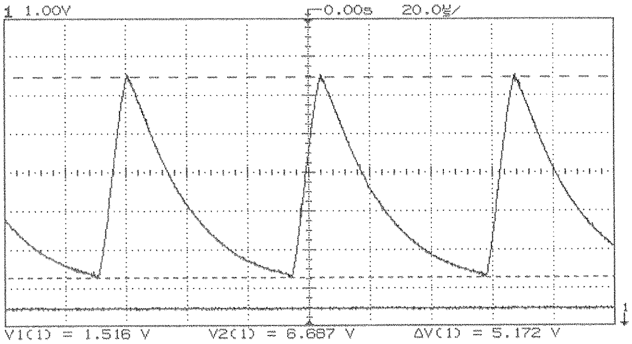
㊹ P67A pin# 6-V.OUT



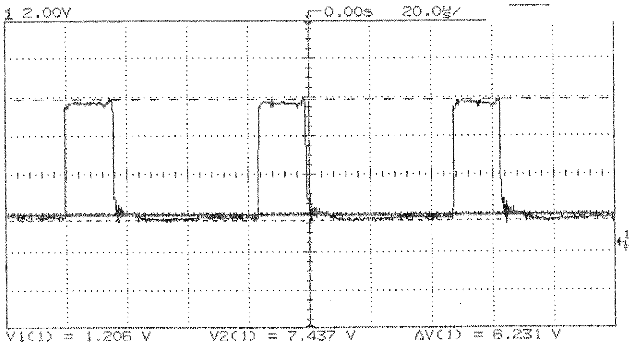
㊺ I621 pin# 3-(POS)



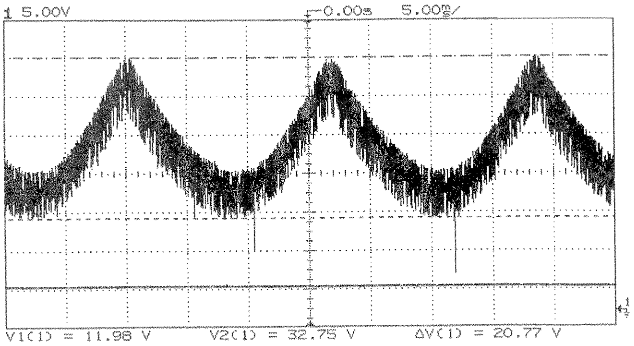
㊻ I621 pin# 2-(NEG)



㊼ P67B pin# 10-H.SIZE



㊽ P77B pin#5-HFB



REPLACEMENT PARTS LIST

PRODUCT SAFETY NOTICE: Components marked with a ⚠ have special characteristics important to safety. Before replacing any of these components, carefully read the PRODUCT SAFETY NOTICE of this Service Manual. Don't degrade the safety of the receiver through improper servicing

ABBREVIATIONS

Capacitors:

CD: Ceramic Disc
PF: Polyesyter Film
EL: Electrolytic
PP: Polypropylene
PR: Paper
TA: Tantalum
TM: Trimmer
MC: Mylar

Resistors:

CF: Carbon Film
CC: Carbon Composition
MF: Metal Oxide Film
VR: Variable Resistor
WW: Wire Wound
FR: Fuse Resistor
MG: Metal Glaze

Semiconductors:

TR: Transistor
DI: Diode
ZD: Zener Diode
VA: Varistor
TH: Thermistor
IC: Integrated Circuit

Misc:

SC: Solder Coated

SYMBOL NO.	PART NO.	PART DESCRIPTION
		CAPACITORS
C001	0800325R	CAP.-EL 100UF-M 10V
C003	0890087R	CAP.-CERAMIC 1000PF-K 50V
C004	0890076R	CAP.CERAMIC 150PF-K 50V
C006	0800279R	CAP.-EL 1.0UF-M(SMG) 50V
C007	0800279R	CAP.-EL 1.0UF-M(SMG) 50V
C009	0890078R	CAP.-CERAMIC 220PF-K 50V
C00T	0283127	TRIMMER CAPACITOR (RED)
C010	0890087R	CAP.-CERAMIC 1000PF-K 50V
C011	0800279R	CAP.-EL 1.0UF-M(SMG) 50V
C012	0880016R	CAP.-PF 0.1UF 50V
C013	0890123R	CAP.-CERAMIC 47PF-J CH 50V
C015	0800351R	CAP.-EL 470UF-M 6.3V
C016	0890117R	CAP. CERAMIC 18PF-J 50V
C017	0890117R	CAP. CERAMIC 18PF-J 50V
C018	0800279R	CAP.-EL 1.0UF-M(SMG) 50V
C019	0800316R	CAP.-EL 47UF-M(SMG) 10V
C020	0880016R	CAP.-PF 0.1UF 50V
C022	0800286R	CAP.-EL 4.7UF-M(SMG) 25V
C023	0800291R	CAP.-EL 10UF-M(SMG) 16V
C024	0890074R	CAP.-CERAMIC 100PF-J 50V
C028	0890087R	CAP.-CERAMIC 1000PF-K 50V
C029	0800286R	CAP.-EL 4.7UF-M(SMG) 25V
C02A	0800317R	CAP.-EL 47UF-M(SMG) 16V
C02C	0890068R	CAP.-CERAMIC 39PF-J 50V
C02D	0890068R	CAP.-CERAMIC 39PF-J 50V
C02E	0890068R	CAP.-CERAMIC 39PF-J 50V
C02F	0890123R	CAP.-CERAMIC 47PF-J CH 50V
C02G	0890064R	CAP.-CERAMIC 18PF-J SL 50V
C030	0890074R	CAP.-CERAMIC 100PF-J 50V
C031	0880016R	CAP.-PF 0.1UF 50V
C040	0890087R	CAP.-CERAMIC 1000PF-K 50V
C041	0800324R	CAP.-EL 100UF-M(SMG) 6.3V
C042	0890084R	CAP.-CERAMIC 560PF-K 50V
C050	0880016R	CAP.-PF 0.1UF 50V
C051	0880016R	CAP.-PF 0.1UF 50V
C052	0800324R	CAP.-EL 100UF-M(SMG) 6.3V
C061	0890077R	CAP.-CERAMIC 180PF-K 50V
C062	0890077R	CAP.-CERAMIC 180PF-K 50V
C063	0890077R	CAP.-CERAMIC 180PF-K 50V
C064	0890077R	CAP.-CERAMIC 180PF-K 50V
C100	0800291R	CAP.-EL 10UF-M(SMG) 16V
C101	0800324R	CAP.-EL 100UF-M(SMG) 6.3V
C102	0244105R	CAP.-CERAMIC 2200PF-K 50V TAPE
C103	0800361N	CAP.-ELECTRO 1000UF 16V
C104	0244105R	CAP.-CERAMIC 2200PF-K 50V TAPE
C105	0880003R	MYLAR CAPACITOR 0.001U
C201	0800361N	CAP.-ELECTRO 1000UF 16V
C202	0890072R	CAP.-CERAMIC 68PF-J 50V
C203	0880014R	MYLAR CAPACITOR 0.047U
C204	0890089R	CAP.-CERAMIC 1500PF-K 50V
C205	0890089R	CAP.-CERAMIC 1500PF-K 50V
C206	0890089R	CAP.-CERAMIC 1500PF-K 50V
C240	0890067R	CAP.-CERAMIC 33PF-J 50V
C241	0890067R	CAP.-CERAMIC 33PF-J 50V
C242	0890069R	CAP.-CERAMIC 47PF-J 50V
C245	0880009R	CAP.-POLYESTER 0.01UF-K 50V
C248	0880019R	CAP.-POLYESTER 0.33UF-KB 50V
C290	0880009R	CAP.-POLYESTER 0.01UF-K 50V
C301	0880016R	CAP.-PF 0.1UF 50V
C304	0800282R	CAP.-EL 2.2UF-M(SMG) 50V
C305	0800282R	CAP.-EL 2.2UF-M(SMG) 50V
C311	0800286R	CAP.-EL 4.7UF-M(SMG) 25V
C331	0800291R	CAP.-EL 10UF-M(SMG) 16V
C381	0800326R	CAP.-EL 100UF-M 16V
C382	0800291R	CAP.-EL 10UF-M(SMG) 16V
C383	0800326R	CAP.-EL 100UF-M 16V
C384	0880009R	CAP.-POLYESTER 0.01UF-K 50V
C385	0800291R	CAP.-EL 10UF-M(SMG) 16V
C386	0800326R	CAP.-EL 100UF-M 16V
C387	0880009R	CAP.-POLYESTER 0.01UF-K 50V
C3Y1	0800291R	CAP.-EL 10UF-M(SMG) 16V
C402	0880009R	CAP.-POLYESTER 0.01UF-K 50V
C404	0880016R	CAP.-PF 0.1UF 50V
C405	0880016R	CAP.-PF 0.1UF 50V
C406	0880012R	MYLAR CAPACITOR 0.022U 0204249C
C407	0800292R	CAP.-EL 10UF-M(SMG) 25V
C408	0880012R	MYLAR CAPACITOR 0.022U 0204249C
C411	0800354R	CAP.-EL 470UF-M 25V
C412	0800354R	CAP.-EL 470UF-M 25V
C414	0800354R	CAP.-EL 470UF-M 25V
C416	0800326R	CAP.-EL 100UF-M 16V
C418	0800317R	CAP.-EL 47UF-M(SMG) 16V
C419	0800353R	CAP.-EL470UF-M 16V
C440	0800277R	CAP.-EL 0.47UF-M 50V
C441	0800286R	CAP.-EL 4.7UF-M(SMG) 25V
C442	0880016R	CAP.-EL 100UF-M 10V
C443	0880014R	MYLAR CAPACITOR 0.047U
C444	0800101R	CAP.-EL 0.1UF-M 50V
C445	0800279R	CAP.-EL 1.0UF-M(SMG) 50V
C446	0800286R	CAP.-EL 4.7UF-M(SMG) 25V
C447	0880016R	CAP.-PF 0.1UF 50V
C448	0800299R	CAP.-EL 22UF-M(SMG) 16V
C450	0800279R	CAP.-EL 1.0UF-M(SMG) 50V
C451	0800279R	CAP.-EL 1.0UF-M(SMG) 50V
C452	0800279R	CAP.-EL 1.0UF-M(SMG) 50V
C453	0292712F	CAP.-TA 3.3UF-K 16V
C454	0292714F	CAP.-TA 10UF-K 16V
C455	0800279R	CAP.-EL 1.0UF-M(SMG) 50V
C456	0800279R	CAP.-EL 1.0UF-M(SMG) 50V

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SYMBOL NO.	PART NO.	PART DESCRIPTION	SYMBOL NO.	PART NO.	PART DESCRIPTION
C461	0800317R	CAP.-EL 47UF-M(SMG) 16V	C620	0880009R	CAP.-POLYESTER 0.01UF-K 50V
C462	0800286R	CAP.-EL 4.7UF-M(SMG) 25V	C621	0880011R	MYLAR CAPACITOR 0.015UF
C463	0800286R	CAP.-EL 4.7UF-M(SMG) 25V	C622	0880016R	CAP.-PF 0.1UF 50V
C46A	0800279R	CAP.-EL 1.0UF-M(SMG) 50V	C62E	0292716R	CAP.-TA 1.0UF-K 20V
C46C	0800279R	CAP.-EL 1.0UF-M(SMG) 50V	C63E	0880003R	MYLAR CAPACITOR 0.001U
C471	0800286R	CAP.-EL 4.7UF-M(SMG) 25V	C64E	0800361N	CAP.-ELECTRO 1000UF 16V
C472	0800286R	CAP.-EL 4.7UF-M(SMG) 25V	C671	0800294R	CAP.-EL 10UF-M(SMG) 50V
C473	0890089R	CAP.-CERAMIC 1500PF-K 50V	C672	0800326R	CAP.-EL 100UF-M 16V
C474	0890089R	CAP.-CERAMIC 1500PF-K 50V	C701	0800335R	CAP.-EL 220UF-M(SMG) 16V
C475	0244105R	CAP.-CERAMIC 2200PF-K 50V TAPE	C702	0800335R	CAP.-EL 220UF-M(SMG) 16V
C476	0244105R	CAP.-CERAMIC 2200PF-K 50V TAPE	C705	0253974F	CAP.-EL 33UF 250V CE04W2E330MF
C481	0800335R	CAP.-EL 220UF-M(SMG) 16V	C70A	0244210	CAP.-CERAMIC 820PF-K 2KV
C482	0800326R	CAP.-EL 100UF-M 16V	C70C	0244210	CAP.-CERAMIC 820PF-K 2KV
C483	0880009R	CAP.-POLYESTER 0.01UF-K 50V	C710	0244501R	CAP.-CERAMIC 1000PF-K 500V
C502	0890074R	CAP.-CERAMIC 100PF-J 50V	C711	0800355N	CAP.EL 470UF-M 35V
C503	0800279R	CAP.-EL 1.0UF-M(SMG) 50V	⚠ C712	0279687R	CAP.-POLY 0.01UF-100V
C505	0800291R	CAP.-EL 10UF-M(SMG) 16V	⚠ C713	0262425F	CAP.-POLYESTER 0.0082UF 1.8KV
C506	0800279R	CAP.-EL 1.0UF-M(SMG) 50V	⚠ C714	0262414F	CAP.POLYPRO 3300PF 1800V
C507	0880016R	CAP.-PF 0.1UF 50V	⚠ C716	0299930F	CAP.-POLYPRO. 0.22UF-K 200V
C509	0244105R	CAP.-CERAMIC 2200PF-K 50V TAPE	⚠ C71A	0244210F	CAP.-CERAMIC 820PF-K 2KV
C510	0800277R	CAP.-EL 0.47UF-M 50V	⚠ C71C	0279687R	CAP.-POLY 0.01UF-100V
C511	0890061R	CAP.-CERAMIC 10PF- 50V	⚠ C71G	0262432F	CAP.-POLYPRO. 15000PF-J 1800V
C512	0880012R	MYLAR CAPACITOR 0.022U 0204249C	⚠ C71H	0299988F	CAP.-PP FILM 0.047UF-J 630V
C513	0800277R	CAP.-EL 0.47UF-M 50V	⚠ C71M	0262803F	CAP.-POLYPRO. 0.68UF-J 250V
C515	0880016R	CAP.-PF 0.1UF 50V	C720	0244503R	CAP.-CERAMIC 1500PF-K 500V TAPE
C516	0880016R	CAP.-PF 0.1UF 50V	⚠ C722	0299621	CAP.-PP FILM 0.0082UF-J 630V
C517	0880016R	CAP.-PF 0.1UF 50V	C724	0299926F	CAP.-PF 0.1UF-K 200V
C518	0244105R	CAP.-CERAMIC 2200PF-K 50V TAPE	C725	0880016R	CAP.-PF 0.1UF 50V
C519	0800326R	CAP.-EL 100UF-M 16V	C726	0880044R	CAP.-POLYESTER 0.01UF-KEB 50V
C520	0244105R	CAP.-CERAMIC 2200PF-K 50V TAPE	C727	0800299R	CAP.-EL 22UF-M(SMG) 16V
C521	0800353R	CAP.-EL470UF-M 16V	C729	0800361N	CAP.-ELECTRO 1000UF 16V
C523	0244105R	CAP.-CERAMIC 2200PF-K 50V TAPE	C72H	0800343R	CAP.-ELECTRO 330UF-M(SMG) 10V
C524	0800361N	CAP.-ELECTRO 1000UF 16V	⚠ C730	0243508R	CAP.-CERAMIC 390PF-K 500V
C525	0800282R	CAP.-EL 2.2UF-M(SMG) 50V	C731	0243508R	CAP.-CERAMIC 390PF-K 500V
C526	0244105R	CAP.-CERAMIC 2200PF-K 50V TAPE	⚠ C732	0253957F	CAP.-EL 22UF-M 160V
C527	0800353R	CAP.-EL470UF-M 16V	C73H	0800326R	CAP.-EL 100UF-M 16V
C551	0800326R	CAP.-EL 100UF-M 16V	C741	0244501R	CAP.-CERAMIC 1000PF-K 500V
C555	0244141R	CAP.-CERAMIC 0.01UF-KB B 50V	C742	0244501R	CAP.-CERAMIC 1000PF-K 500V
C556	0284623R	CAP.-EL 1UF-SME(BP) 50V	C743	0244501R	CAP.-CERAMIC 1000PF-K 500V
C558	0284623R	CAP.-EL 1UF-SME(BP) 50V	C745	0244505R	CAP-CERAMIC 0.0022UF-K 500V
C561	0800282R	CAP.-EL 2.2UF-M(SMG) 50V	C746	0880059R	CAP.-POLYESTER 0.15UF-KEB 50V
C563	0800282R	CAP.-EL 2.2UF-M(SMG) 50V	C751	0880013R	MYLAR CAP. 0.033UF-K 50V
C565	0800282R	CAP.-EL 2.2UF-M(SMG) 50V	C752	0800279R	CAP.-EL 1.0UF-M(SMG) 50V
C568	0880016R	CAP.-PF 0.1UF 50V	C756	0800326R	CAP.-EL 100UF-M 16V
C582	0880016R	CAP.-PF 0.1UF 50V	C757	0880009R	CAP.-POLYESTER 0.01UF-K 50V
C586	0800326R	CAP.-EL 100UF-M 16V	C773	0244501	CAP. CERAMIC 1000PF-K 500V
C587	0880016R	CAP.-PF 0.1UF 50V	C774	0880009R	CAP.-POLYESTER 0.01UF-K 50V
C5C1	0880003R	MYLAR CAPACITOR 0.001U	⚠ C775	0259471R	CAP.EL 6.8UF-M (BP) 50V TAPE
C601	0880012R	MYLAR CAPACITOR 0.022U 0204249C	⚠ C776	0259471R	CAP.EL 6.8UF-M (BP) 50V TAPE
C602	0880059R	CAP.-POLYESTER 0.15UF-KEB 50V	C777	0800049R	CAP.-EL 100UF-M 16V
C603	0800291R	CAP.-EL 10UF-M(SMG) 16V	C778	0880057R	CAP.-POLYESTER 0.1UF-KEB 50V
C604	0890079R	CAP.-CERAMIC 270PF-K 50V	C781	0800317R	CAP.-EL 47UF-M(SMG) 16V
C606	0800328R	CAP. EL 100UF-M 35V	C782	0244507F	CAP.-CERAMIC 3300PF-K B 500V
C609	0800367N	CAP.-EL 2200UF-M 16V	C783	0800326R	CAP.-EL 100UF-M 16V
C60E	0880012R	MYLAR CAPACITOR 0.022U 0204249C	C783	0299926F	CAP.-PF 0.1UF-K 200V
C610	0880012R	MYLAR CAPACITOR 0.022U 0204249C	C788	0253862	CAP.-EL 220UF-M 160V
C613	0800007R	CAP.-EL 3.3UF-M 50V	C798	0800326R	CAP.-EL 100UF-M 16V
C618	0800326R	CAP.-EL 100UF-M 16V	C799	0800326R	CAP.-EL 100UF-M 16V
C619	0880007R	MYLAR CAPACITOR 0.0047UF 50V	C7S1	0880016R	CAP.-PF 0.1UF 50V
C61E	0800279R	CAP.-EL 1.0UF-M(SMG) 50V	C7S2	0244501R	CAP.-CERAMIC 1000PF-K 500V

REPLACEMENT PARTS LIST

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SYMBOL NO.	PART NO.	PART DESCRIPTION
C801	0890085R	CAP.-CERAMIC 680PF-K 50V
C802	0890084R	CAP.-CERAMIC 560PF-K 50V
C803	0890085R	CAP.-CERAMIC 680PF-K 50V
C851	0800326R	CAP.-EL 100UF-M 16V
C859	0255524F	CAP.-EL 4.7MF-M 250V(KME)
C860	0244889	CAP.-CERAMIC 2200PF-K B 2KV
C866	0244171R	CAP.-CERAMIC 0.01UF-Z F 50V TAPE
C874	0880016R	CAP.-PF 0.1UF 50V
C875	0880016R	CAP.-PF 0.1UF 50V
C876	0880016R	CAP.-PF 0.1UF 50V
C877	0890074R	CAP.-CERAMIC 100PF-J 50V
C878	0890074R	CAP.-CERAMIC 100PF-J 50V
C879	0890074R	CAP.-CERAMIC 100PF-J 50V
⚠ C901	AN00144S	PLASTIC FILM CAPACITOR(0.1UF250V)
⚠ C902	AN00144S	PLASTIC FILM CAPACITOR(0.1UF250V)
⚠ C903	0249495F	CAP.CERAMIC 4700P-FZ 125V
⚠ C904	0249495F	CAP.CERAMIC 4700P-FZ 125V
⚠ C905	0259168	CAP.-EL 820UF-M 200V (HR)
⚠ C906	0800291R	CAP.-EL 10UF-M(SMG) 16V
C908	0800345R	CAP.-EL 330UF-M(SMG) 25V
C909	0890087R	CAP.-CERAMIC 1000PF-K 50V
C911	0245611F	CAP.-CERAMIC 3300PF-K 1000V
C913	0890083R	CAP.-CERAMIC 470PF-K 50V
C915	0880004R	MYLAR CAPACITOR 0.0015U
⚠ C930	0249392F	CAP.-CERAMIC 2200PF 125V
C931	0243507R	CAP.-CERAMIC 330PF-K 500V TAPE
C932	0800335R	CAP.-EL 220UF-M(SMG) 16V
C933	0243507R	CAP.-CERAMIC 330PF-K 500V TAPE
C935	0800361N	CAP.-ELECTRO 1000UF 16V
C936	0251704	ELECTROLYTIC CAPACITOR (KMH 470/160V)
C938	0800368N	CAP.-EL 2200UF-M 25V
C939	0800333R	CAP.-EL220UF-M 6.3V
C940	0880016R	CAP.-PF 0.1UF 50V
C941	0800279R	CAP.-EL 1.0UF-M(SMG) 50V
C942	0800333R	CAP.-EL220UF-M 6.3V
C945	0800333R	CAP.-EL220UF-M 6.3V
C948	0800326R	CAP.-EL 100UF-M 16V
⚠ C953	0800294R	CAP.-EL 10UF-M(SMG) 50V
⚠ C955	0800336R	CAP.-EL 220UF-M(SMG) 25V
C956	0244889	CAP.-CERAMIC 2200PF-K B 2KV
C957	0800326R	CAP.-EL 100UF-M 16V
C959	0800286R	CAP.-EL 4.7UF-M(SMG) 25V
⚠ C981	0249392F	CAP.-CERAMIC 2200PF 125V
⚠ C983	0249392F	CAP.-CERAMIC 2200PF 125V
CA26	0800291R	CAP.-EL 10UF-M(SMG) 16V
CA28	0800291R	CAP.-EL 10UF-M(SMG) 16V
CA38	0800317R	CAP.-EL 47UF-M(SMG) 16V
CC31	0880016R	CAP.-PF 0.1UF 50V
CC32	0880009R	CAP.-POLYESTER 0.01UF-K 50V
CC33	0880009R	CAP.-POLYESTER 0.01UF-K 50V
CC34	0880009R	CAP.-POLYESTER 0.01UF-K 50V
CC36	0800286R	CAP.-EL 4.7UF-M(SMG) 25V
CC37	0800286R	CAP.-EL 4.7UF-M(SMG) 25V
CC38	0880009R	CAP.-POLYESTER 0.01UF-K 50V
CC39	0800353R	CAP.-EL470UF-M 16V
CC40	0890078R	CAP.-CERAMIC 220PF-K 50V
CC55	0284623R	CAP.-EL 1UF-SME(BP) 50V
CDT41	0890073R	CAP.-CERAMIC 82PF-J 50V
CDT42	0890073R	CAP.-CERAMIC 82PF-J 50V
CDT43	0890073R	CAP.-CERAMIC 82PF-J 50V
CN01	0800291R	CAP.-EL 10UF-M(SMG) 16V
CN03	0890078R	CAP.-CER. 220PF-K 50V
CN06	0890074R	CAP.-CER. 100PF-J 50V
CN07	0880009R	CAP.-POLYESTER 0.01UF-K 50V
CN09	0800291R	CAP.-EL 10UF-M(SMG) 16V
CN0A	0800317R	CAP.-EL 47UF-M(SMG) 16V
CN10	0800286R	CAP.-EL 4.7UF-M(SMG) 25V
CN11	0880008R	MYLAR CAPACITOR 6800PF-K 50V
CN12	0800286R	CAP.-EL 4.7UF-M(SMG) 25V
CN14	0800286R	CAP.-EL 4.7UF-M(SMG) 25V
CN15	0800286R	CAP.-EL 4.7UF-M(SMG) 25V
CN16	0880009R	CAP.-POLYESTER 0.01UF-K 50V
CN17	0880009R	CAP.-POLYESTER 0.01UF-K 50V
CN40	0890083R	CAP.-CER. 470PF-K 50V
CN41	0800361N	CAP.-ELECTRO 1000UF 16V
CN42	0880009R	CAP.-POLYESTER 0.01UF-K 50V
CN43	0246466R	CAP.-CER. 120PF-J CH 50V
CN43A	0246466R	CAP.-CER. 120PF-J CH 50V
CN44	0246466R	CAP.-CER. 120PF-J CH 50V
CN45	0800324R	CAP.-EL 100UF-M(SMG) 6.3V
CN46	0880009R	CAP.-POLYESTER 0.01UF-K 50V
CN47	0880009R	CAP.-POLYESTER 0.01UF-K 50V
CN48	0800286R	CAP.-EL 4.7UF-M(SMG) 25V
CN49	0246466R	CAP.-CER. 120PF-J CH 50V
CN4A	0246466R	CAP.-CER. 120PF-J CH 50V
CN52	0246466R	CAP.-CER. 120PF-J CH 50V
CN61	0800326R	CAP.-EL 100UF-M 16V
CN62	0880009R	CAP.-POLYESTER 0.01UF-K 50V
CN63	0800291R	CAP.-EL 10UF-M(SMG) 16V
CN71	0800279R	CAP.-EL 1.0UF-M(SMG) 50V
CN72	0800353R	CAP.-EL470UF-M 16V
CN73	0880009R	CAP.-POLYESTER 0.01UF-K 50V
CN74	0880009R	CAP.-POLYESTER 0.01UF-K 50V
CN75	0292716R	CAP.-TA 1.0UF-K 20V
CN76	0800279R	CAP.-EL 1.0UF-M(SMG) 50V
CN78	0244105R	CAP.-CER. 2200PF-K 50V TAPE
CN79	0800361N	CAP.-ELECTRO 1000UF 16V
CN7A	0880009R	CAP.-POLYESTER 0.01UF-K 50V
CN7F	0800279R	CAP.-EL 1.0UF-M(SMG) 50V
CN7G	0880008R	MYLAR CAPACITOR 6800PF-K 50V
CN7H	0880011R	MYLAR CAPACITOR 0.015UF
CN7J	0880008R	MYLAR CAPACITOR 6800PF-K 50V
CN7K	0284623R	CAP.-EL 1UF-SME(BP) 50V
CN7L	0299009R	CAP.-POLY.FLM 0.0022UF 100V
CN90	0800326R	CAP.-EL 100UF-M 16V
CN91	0800353R	CAP.-EL470UF-M 16V
CP01	0800082N	CAP.-EL 1000UF-MB16V(SME)
CP51	0890072R	CAP.-CER 68PF-J 50V
CP52	0890072R	CAP.-CER 68PF-J 50V
CP53	0890072R	CAP.-CER. 68PF-J 50V
CP54	0800326R	CAP.-EL 100UF-M 16V
CR403	0800041R	CAP.-EL 47UF-M 16V
CR404	0800041R	CAP.-EL 47UF-M 16V
CS01	0800291R	CAP.-EL 10UF-M(SMG) 16V
CS02	0880009R	CAP.-POLYESTER 0.01UF-K 50V
CS03	0880203R	CAP.-POLYESTER 0.47UF-J 50V
CS04	0880012R	MYLAR CAPACITOR 0.022U 0204249C
CS05	0880009R	CAP.-POLYESTER 0.01UF-K 50V
CS06	0800326R	CAP.-EL 100UF-M 16V
CSA0	0890074R	CAP.-CER. 100PF-J 50V

REPLACEMENT PARTS LIST

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SYMBOL NO.	PART NO.	PART DESCRIPTION	SYMBOL NO.	PART NO.	PART DESCRIPTION
CSA1	0800324R	CAP.-EL 100UF-M(SMG) 6.3V	D022	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC
CSA2	0880009R	CAP.-POLYESTER 0.01UF-K 50V	D023	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC
CSA3	0880016R	CAP.-PF 0.1UF 50V	D024	2339889M	ZENER HZS12 (C3) 0.005A
CSA4	0800317R	CAP.-EL 47UF-M(SMG) 16V	D101	2339837M	ZENER HZS-5C1 TAPE
CSA6	0880012R	MYLAR CAPACITOR 0.022U 0204249C	D102	2339971M	ZENER HZS33-1 TA
CSA7	0880203R	CAP.-POLYESTER 0.47UF-J 50V	D271	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC
CSA8	0880009R	CAP.-POLYESTER 0.01UF-K 50V	D301	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC
CSA9	0890074R	CAP.-CER. 100PF-J 50V	D381	2339839M	ZENER HZS5C3 TAPE
CSE1	0800335R	CAP.-EL 220UF-M(SMG) 16V	D404	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC
CT02	0800286R	CAP.-EL 4.7UF-M(SMG) 25V	D405	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC
CT03	0890089R	CAP.-CER. 1500PF-K 50V	D406	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC
CT04	0800326R	CAP.-EL 100UF-M 16V	D407	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC
CT05	0890089R	CAP.-CER. 1500PF-K 50V	D407	2339867M	ZENER HZS-9-C1 TAPE (SI.200MA)
CT11	0800291R	CAP.-EL 10UF-M(SMG) 16V	D408	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC
CT12	0800291R	CAP.-EL 10UF-M(SMG) 16V	D501	2339819M	ZENER HZS3C3 TA
CT13	0800291R	CAP.-EL 10UF-M(SMG) 16V	D507	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC
CT15	0800082N	CAP.-EL 1000UF-MB16V(SME)	D508	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC
CVC1	0800277R	CAP.-EL 0.47UF-M 50V	D509	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC
CVC2	0800337R	CAP.-EL 220UF 35V (SMG TY PE)	D510	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC
CW01	0284621R	CAP.-EL 0.47UF 50V (BP)	D563	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC
CW04	0890081R	CAP.-CER. 330PF 50V	D564	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC
CW05	0800326R	CAP.-EL 100UF-M 16V	D565	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC
CW06	0880009R	CAP.-POLYESTER 0.01UF-K 50V	D581	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC
CW09	0890074R	CAP.-CER. 100PF-J 50V	D601	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC
CW10	0244541F	CAPACITOR-CER. 0.01MF-K B 500V	D604	2339491M	DIODE AM01Z (200 TAPE) 1A
CW11	0890074R	CAP.-CER. 100PF-J 50V	D605	2339971M	ZENER HZS33-1 TA
CW12	0244509R	CAP.-CER. 4700PF-KB B 500V	D606	2339971M	ZENER HZS33-1 TA
CW13	0253959F	CAP.-EL 47UF-M 160V	D607	2339867M	ZENER HZS-9-C1 TAPE (SI.200MA)
CW14	0253959F	CAP.-EL 47UF-M 160V	D60E	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC
CW15	0253957F	CAP.-EL 22UF-M 160V	D61E	2339889M	ZENER HZS12 (C3) 0.005A
CW16	0247848R	CAP.-CER. 56PF-J SL 500V	D621	2339881M	ZENER HZS12A1 TA
CW17	0800353R	CAP.-EL470UF-M 16V	D622	2339889M	ZENER HZS12 (C3) 0.005A
CW18	0880009R	CAP.-POLYESTER 0.01UF-K 50V	D671	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC
CW19	0253959F	CAP.-EL 47UF-M 160V	D672	2339892M	DIODE (HZS15-2TA)
CW20	0244541F	CAPACITOR-CER. 0.01MF-K B 500V	D6N1	2339867M	ZENER HZS-9-C1 TAPE (SI.200MA)
CW22	0880016R	CAP.-PF 0.1UF 50V	D702	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC
CW23	0800326R	CAP.-EL 100UF-M 16V	D703	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC
CW24	0800317R	CAP.-EL 47UF-M(SMG) 16V	D704	2339867M	ZENER HZS-9-C1 TAPE (SI.200MA)
CW27	0880009R	CAP.-POLYESTER 0.01UF-K 50V	D705	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC
CW28	0890077R	CAP.-CER. 180PF-K 50V	⚠ D706	2339223M	ZENER HZS27 (3L)
CY39	0800291R	CAP.-EL 10UF-M(SMG) 16V	D707	2339882M	ZENER DIODE HZS-12(A2) TAPE
CY42	0880016R	CAP.-PF 0.1UF 50V	D708	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC
CY43	0800324R	CAP.-EL 100UF-M(SMG) 6.3V	D70A	CH00031M	DIODE AU02V1(280V)
CY44	0880016R	CAP.-PF 0.1UF 50V	D710	2338944	DIODE FML-G12S (F) (200V) SI 0.04USEC
CY45	0890121R	CAP.-CER. 33PF-J CH 50V	⚠ D712	CH00551F	DIODE FMQ-G5FS LF715 1500V
CY46	0890121R	CAP.-CER. 33PF-J CH 50V	⚠ D714	2344071	DIODE ERC20M-04
CY47	0890123R	CAP.-CER. 47PF-J CH 50V	D717	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC
CY48	0890123R	CAP.-CER. 47PF-J CH 50V	⚠ D718	2339242M	ZENER HZS332L TAPE
CY49	0880016R	CAP.-PF 0.1UF 50V	⚠ D719	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC
		DIODES	⚠ D725	2339481M	DIODE AS01Z (200 TAPE) SI 0.6A
D001	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC	D72H	2336612M	DIODE RU3AM TA
D002	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC	D730	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC
D005	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC	D732	2339481M	DIODE AS01Z (200 TAPE) SI 0.6A
D007	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC	D733	CH00031M	DIODE AU02V1(280V)
D008	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC	D735	2339869M	ZENER HZS9C3 TA
D009	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC	D73H	2339848M	ZENER HZS-6-C2 TAPE
D010	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC	D744	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC
D011	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC	D74H	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC
D020	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC	D751	2339491M	DIODE AM01Z (200 TAPE) 1A
D021	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC	D752	2339491M	DIODE AM01Z (200 TAPE) 1A

REPLACEMENT PARTS LIST

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SYMBOL NO.	PART NO.	PART DESCRIPTION
D752	2339867M	ZENER HZS-9-C1 TAPE (SI.200MA)
D754	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC
D755	2339481M	DIODE AS01Z (200 TAPE) SI 0.6A
D756	2339481M	DIODE AS01Z (200 TAPE) SI 0.6A
D75H	2339491M	DIODE AM01Z (200 TAPE) 1A
D771	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC
D772	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC
D773	2339828M	ZENER HZS-4C TAPE
D774	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC
D775	2339481M	DIODE AS01Z (200 TAPE) SI 0.6A
D776	2343961M	DIODE MPG06D G23 TA
D777	2343961M	DIODE MPG06D G23 TA
D778	2343961M	DIODE MPG06D G23 TA
D779	2343961M	DIODE MPG06D G23 TA
D785	2339491M	DIODE AM01Z (200 TAPE) 1A
D78A	2339882M	ZENER DIODE HZS-12(A2) TAPE
D78C	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC
D801	2339821M	ZENER HZS4A1 TA
D804	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC
D805	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC
D806	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC
D820	2339601M	ZENER HZS-2 TAPE (ALL) SI 400MW 2.0V
D821	2339601M	ZENER HZS-2 TAPE (ALL) SI 400MW 2.0V
D822	2339601M	ZENER HZS-2 TAPE (ALL) SI 400MW 2.0V
D823	2339868M	ZENER HZS9C2 TAPE
D825	2339868M	ZENER HZS9C2 TAPE
D826	2339868M	ZENER HZS9C2 TAPE
D855	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC
D856	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC
D857	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC
D858	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC
⚠ D901	2342062	DIODE D3SBA60-4103
D902	2339481M	DIODE AS01Z (200 TAPE) SI 0.6A
D903	2334324M	ZENER DIODE RD36E TAPE (B3) SI 500MW 36
D905	2339481M	DIODE AS01Z (200 TAPE) SI 0.6A
D906	2339481M	DIODE AS01Z (200 TAPE) SI 0.6A
D908	2339835M	ZENER HZS5B2 TAPE
D909	2339481M	DIODE AS01Z (200 TAPE) SI 0.6A
D910	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC
D931	2339491M	DIODE AM01Z (200 TAPE) 1A
D932	2338944	DIODE FML-G12S (F) (200V) SI 0.04USEC
D934	2349861	DIODE FMU-G16S
D936	2338944	DIODE FML-G12S (F) (200V) SI 0.04USEC
D937	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC
D938	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC
D939	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC
D93A	2339835M	ZENER HZS5B2 TAPE
⚠ D940	2339222M	ZENER HZS27-2L
D941	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC
D946	2339882M	ZENER DIODE HZS-12(A2) TAPE
D947	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC
⚠ D955	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC
D962	2339491M	DIODE AM01Z (200 TAPE) 1A
D963	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC
D964	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC
D974	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC
DD01	2339889M	ZENER HZS12 (C3) 0.005A
DD02	2339889M	ZENER HZS12 (C3) 0.005A
DD03	2339889M	ZENER HZS12 (C3) 0.005A
DD04	2339889M	ZENER HZS12 (C3) 0.005A
DD05	2339889M	ZENER HZS12 (C3) 0.005A
DD06	2339889M	ZENER HZS12 (C3) 0.005A
DD07	2339889M	ZENER HZS12 (C3) 0.005A
DD08	2339889M	ZENER HZS12 (C3) 0.005A
DD09	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC
DD09A	2339889M	ZENER HZS12 (C3) 0.005A
DD10	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC
DD10A	2339889M	ZENER HZS12 (C3) 0.005A
DD11	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC
DD11A	2339889M	ZENER HZS12 (C3) 0.005A
DD12	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC
DD12A	2339889M	ZENER HZS12 (C3) 0.005A
DD13	2339889M	ZENER HZS12 (C3) 0.005A
DD16	2339889M	ZENER HZS12 (C3) 0.005A
DD17	2339889M	ZENER HZS12 (C3) 0.005A
DD18	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC
DD19	2339889M	ZENER HZS12 (C3) 0.005A
DK109	2339481M	DIODE AS01Z (200 TAPE) SI 0.6A
DK276	2339481M	DIODE AS01Z (200 TAPE) SI 0.6A
DK436	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC
DK437	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC
DK438	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC
DMS1	2339887M	ZENER HZS12C1 TA
DMS2	2339887M	ZENER HZS12C1 TA
DN01	2339839M	ZENER HZS5C3 TAPE
DN02	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC
DN05	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC
DN41	2339881M	ZENER HZS12A1 TA
DN42	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC
DN43	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC
DN44	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC
DN70	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC
DN72	2339872M	ZENER HZS11A2 TA
DN90	2339839M	ZENER HZS5C3 TAPE
DN91	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC
DN92	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC
DP01	2339869M	ZENER HZS9C3 TA
DSA1	2339837M	ZENER HZS-5C1 TAPE
DVC1	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC
DVC2	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC
DVC3	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC
DW01	2339491M	DIODE AM01Z (200 TAPE) 1A
DW02	2339491M	DIODE AM01Z (200 TAPE) 1A
DW03	2339491M	DIODE AM01Z (200 TAPE) 1A
DW04	2339491M	DIODE AM01Z (200 TAPE) 1A
DW05	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC
DW06	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC
DW11	2339491M	DIODE AM01Z (200 TAPE) 1A
DW12	2339491M	DIODE AM01Z (200 TAPE) 1A
DX12	2339889M	ZENER HZS12 (C3) 0.005A
DX14	2339889M	ZENER HZS12 (C3) 0.005A
DX17	2339889M	ZENER HZS12 (C3) 0.005A
DX32	2339889M	ZENER HZS12 (C3) 0.005A
DX33	2339889M	ZENER HZS12 (C3) 0.005A
DY10	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC
DY11	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC
DY12	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC
DY13	2398611M	DIODE 1SS254 TAPE (35V) SI 4NSEC
		FUSES
⚠ F601	2722382	FUS-DC0.75A-J/UL(L)

REPLACEMENT PARTS LIST

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SYMBOL NO.	PART NO.	PART DESCRIPTION
⚠ F701	2722385	FUSE DC2A
⚠ F901	2722359	FUSE AC06A
⚠ F902	2722357	FUSE AC04A
		SPARK GAPS
G801	2340037	SPARK GAP
⚠ G901	2340741	SURGE PROTECTOR DSP-301N-S00B
		COMPOUND COMPONENTS
H001	2791754R	CONDENSER WITH 3 TERMINAL 100PF
H003	2791754R	CONDENSER WITH 3 TERMINAL 100PF
⚠ H901	2793313	CP-EXN-G131P365L
H902	0000000	UNFIXED PART
		INTEGRATED CIRCUITS
I001	CP04281	M37271MF-SP
I002	CP01992U	ST24C04FB6
I003	CZ00461	BIPOLAR SYSTEM RESET IC
I004	CP00871U	DIGITAL MONOLITHIC IC (M62393P)
⚠ I201	CP04301	TA1268N
I381	2003981	IC BA7604N
⚠ I402	CP04041	UPC1854CT
⚠ I403	CP04061	ANALOG MONOLITHIC IC (LA4603)
⚠ I483	2366301	IC UPD4052BC
I551	CP00531U	IC M52320SP
I552	2362651	IC HD14053B
⚠ I601	2913981	IC AN5521
⚠ I602	CP00722U	ANALOG MONOLITHIC IC (TA8859CP)
⚠ I621	2365452	IC NJM2903D
I671	2020507	IC AN7812F
⚠ I7S1	2000465	IC PS2501-1 (KC/LC)
⚠ I901	CT00004	STR-F6516
⚠ I902	2000465	IC PS2501-1 (KC/LC)
⚠ I904	2000465	IC PS2501-1 (KC/LC)
⚠ I931	2381344	IC SE130N
⚠ IN01	CP02821U	ANALOG MONOLITHIC IC (M52347SP)
⚠ IN40	2005491	IC-HD74HC221P
⚠ IN41	2005491	IC-HD74HC221P
⚠ IN6A	2362651	IC HD14053B
⚠ IN71	2364181	IC HA11423
IP01	2363191	INTEGRATED CIRCUIT HD14066BP
ISA1	CP01831	ANALOG MONOLITHIC IC (M62420SP)
⚠ IY02	CP04461	M37470M4-751SP
IY03	CZ00461	BIPOLAR SYSTEM RESET IC
		COILS/INDUCTORS
L001	BH00101	OSC COIL
L003	BH00214R	FILTER COIL 100UH
L010	BH00214R	FILTER COIL 100UH
L011	BH00689R	COIL 27UH
L012	2771892	FERRITE BEADS CORE (004)
L013	2771892	FERRITE BEADS CORE (004)
L014	2771892	FERRITE BEADS CORE (004)
L015	2771892	FERRITE BEADS CORE (004)
L051	2122253M	COIL-AXIAL 100UH-K
L052	2122253M	COIL-AXIAL 100UH-K
L101	2122253M	COIL-AXIAL 100UH-K
L201	BJ00131	VCO TANK COIL 52.37MHZ
L240	BH00689R	COIL 27UH
L242	BH00685R	COIL 12UH
L243	BH00689R	COIL 27UH
L381	2122253M	COIL-AXIAL 100UH-K
L381	2123781R	FILTER COIL 101K
L502	2123781R	FILTER COIL 101K
L611	2123781R	FILTER COIL 101K
L612	2123781R	FILTER COIL 101K
L701	2122248M	COIL-AXIAL 47UH-K
⚠ L702	BZ02052	LINI COIL 4UH PA1
⚠ L703	2275802	LINEARITY COIL 10UH
⚠ L704	BZ02001	DUMMY DY (27V)
L705	2122652M	FERRITE CORE
L706	2122652M	FERRITE CORE
L714A	2771892	FERRITE BEADS CORE (004)
L714B	2771892	FERRITE BEADS CORE (004)
L71H	2771892	FERRITE BEADS CORE (004)
L722A	2771892	FERRITE BEADS CORE (004)
L722B	2771892	FERRITE BEADS CORE (004)
⚠ L751	BZ00843	CHOKE COIL 330UH SL1720
L752	2122652M	FERRITE CORE
L753	BH00561	COIL HC-331K-1
L771	2122253M	COIL-AXIAL 100UH-K
⚠ L774	BZ00848	CHOKE COIL 2200UH SL1720
L775	BZ00841	CHOKE COIL 150UH SL1720
L851	2122243M	COIL-AXIAL 18UH-K
L852	2122243M	COIL-AXIAL 18UH-K
L853	2122243M	COIL-AXIAL 18UH-K
L854	2122249M	COIL-AXIAL 56UH-K
L855	2122249M	COIL-AXIAL 56UH-K
L856	2122249M	COIL-AXIAL 56UH-K
L860	2123468M	FERRITE BEADS CORE LEAD 0.8MH
L861	2123468M	FERRITE BEADS CORE LEAD 0.8MH
L862	2123468M	FERRITE BEADS CORE LEAD 0.8MH
L884	2122253M	COIL-AXIAL 100UH-K
⚠ L901	2169462	LINE FILTER COIL FX--7355-60
⚠ L902	2169462	LINE FILTER COIL FX--7355-60
⚠ L904	2124365	DC NOISE FILTER
L905	2123461M	FERRITE BEADS B 0.8 MH
L905	2165747	COIL-DEGAUSSING
L906	2123461M	FERRITE BEADS B 0.8 MH
L907	2123461M	FERRITE BEADS B 0.8 MH
L908	2123461M	FERRITE BEADS B 0.8 MH
L909	2123461M	FERRITE BEADS B 0.8 MH
L910	2123461M	FERRITE BEADS B 0.8 MH
L930	2123461M	FERRITE BEADS B 0.8 MH
L931	BH00206R	FILTER COIL 27UH
L932	2123461M	FERRITE BEADS B 0.8 MH
L933	2123461M	FERRITE BEADS B 0.8 MH
L934	2123461M	FERRITE BEADS B 0.8 MH
L935	2123461M	FERRITE BEADS B 0.8 MH
L936	2123461M	FERRITE BEADS B 0.8 MH
L937	BH00206R	FILTER COIL 27UH
L950	BZ01932	DC NOISE FILTER
LA02	2122253M	COIL-AXIAL 100UH-K
LJ801	9374575	UL CSA1007-24HP CODE GREEN
LK133	2122253M	COIL-AXIAL 100UH-K
LK415	2122956M	COIL-AXIAL 100UHKM BELTING
LK433	2122956M	COIL-AXIAL 100UHKM BELTING
LN01	2122253M	COIL-AXIAL 100UH-K
LN40	2122253M	COIL-AXIAL 100UH-K
LN41	2122253M	COIL-AXIAL 100UH-K
LN43	2122253M	COIL-AXIAL 100UH-K
LP01	2122253M	COIL-AXIAL 100UH-K
LT01	2122253M	COIL-AXIAL 100UH-K
LT02	2122253M	COIL-AXIAL 100UH-K

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SYMBOL NO.	PART NO.	PART DESCRIPTION
LT12	2122956M	COIL-AXIAL 100UHKM BELTING
LW01	2122943M	COIL-AXIAL 10UHKM BELTING
LW02	2123468M	FERRITE BEADS CORE LEAD 0.8MH
LW03	2123468M	FERRITE BEADS CORE LEAD 0.8MH
LW04	2123468M	FERRITE BEADS CORE LEAD 0.8MH
LY03	2122956M	COIL-AXIAL 100UHKM BELTING
		TRANSISTORS
Q001	2320596M	TRS. 2SC458 (C /D) SI 230MHZ200MW
Q002	2320596M	TRS. 2SC458 (C /D) SI 230MHZ200MW
Q003	2320596M	TRS. 2SC458 (C /D) SI 230MHZ200MW
Q004	2320596M	TRS. 2SC458 (C /D) SI 230MHZ200MW
Q005	2320596M	TRS. 2SC458 (C /D) SI 230MHZ200MW
Q006	2320596M	TRS. 2SC458 (C /D) SI 230MHZ200MW
Q007	2320596M	TRS. 2SC458 (C /D) SI 230MHZ200MW
Q008	2320596M	TRS. 2SC458 (C /D) SI 230MHZ200MW
Q009	2320596M	TRS. 2SC458 (C /D) SI 230MHZ200MW
Q00A	2320596M	TRS. 2SC458 (C /D) SI 230MHZ200MW
Q010	2320596M	TRS. 2SC458 (C /D) SI 230MHZ200MW
Q011	2320637M	TRS. 2SA673 (C 26/D 26) SI 80MHZ 400MW
Q012	2320596M	TRS. 2SC458 (C /D) SI 230MHZ200MW
Q240	2320596M	TRS. 2SC458 (C /D) SI 230MHZ200MW
Q241	2320637M	TRS. 2SA673 (C 26/D 26) SI 80MHZ 400MW
Q242	2320596M	TRS. 2SC458 (C /D) SI 230MHZ200MW
Q271	2320596M	TRS. 2SC458 (C /D) SI 230MHZ200MW
Q301	2320596M	TRS. 2SC458 (C /D) SI 230MHZ200MW
Q381	2320596M	TRS. 2SC458 (C /D) SI 230MHZ200MW
Q402	2320647M	TRS. 2SC1213 (C 21 /D 21) SI 80MHZ400MW
Q411	2320596M	TRS. 2SC458 (C /D) SI 230MHZ200MW
Q461	2320596M	TRS. 2SC458 (C /D) SI 230MHZ200MW
Q462	2320596M	TRS. 2SC458 (C /D) SI 230MHZ200MW
Q481	2320596M	TRS. 2SC458 (C /D) SI 230MHZ200MW
Q482	2320596M	TRS. 2SC458 (C /D) SI 230MHZ200MW
Q520	2320596M	TRS. 2SC458 (C /D) SI 230MHZ200MW
Q553	2320596M	TRS. 2SC458 (C /D) SI 230MHZ200MW
Q557	2320637M	TRS. 2SA673 (C 26/D 26) SI 80MHZ 400MW
Q559	2320637M	TRS. 2SA673 (C 26/D 26) SI 80MHZ 400MW
Q561	2320637M	TRS. 2SA673 (C 26/D 26) SI 80MHZ 400MW
Q578	2320596M	TRS. 2SC458 (C /D) SI 230MHZ200MW
Q581	2320596M	TRS. 2SC458 (C /D) SI 230MHZ200MW
Q582	2320596M	TRS. 2SC458 (C /D) SI 230MHZ200MW
Q583	2320596M	TRS. 2SC458 (C /D) SI 230MHZ200MW
Q584	2320596M	TRS. 2SC458 (C /D) SI 230MHZ200MW
Q603	2320664R	TRS.2SC1213A(B/C)TAPE
Q604	2320637M	TRS. 2SA673 (C 26/D 26) SI 80MHZ 400MW
⚠ Q701	2315391	TRS. 2SC4793
⚠ Q702	CF01541F	2SC2514 F
Q705	2323434	TRS. 2SC1983 (O/Y)
Q706	2320637M	TRS. 2SA673 (C 26/D 26) SI 80MHZ 400MW
Q707	2323434	TRS. 2SC1983 (O/Y)
Q72H	2323434	TRS. 2SC1983 (O/Y)
Q751	2323526M	TRS. 2SD789 D/E TAPE
Q752	2323526M	TRS. 2SD789 D/E TAPE
Q753	2320596M	TRS. 2SC458 (C /D) SI 230MHZ200MW
⚠ Q754	CF00931U	TRS. 2SK2382 200V
⚠ Q756	CF00921F	TRS. FS7KM-18A 900V
Q757	2320596M	TRS. 2SC458 (C /D) SI 230MHZ200MW
Q771	2320596M	TRS. 2SC458 (C /D) SI 230MHZ200MW
Q772	2320637M	TRS. 2SA673 (C 26/D 26) SI 80MHZ 400MW
Q773	2320596M	TRS. 2SC458 (C /D) SI 230MHZ200MW
⚠ Q774	2321591	TRS. 2SD401A (3 K)
Q781	2320647M	TRS. 2SC1213 (C/D)
Q782	2320596M	TRS. 2SC458 (C /D) SI 230MHZ200MW
Q783	2320596M	TRS. 2SC458 (C /D) SI 230MHZ200MW
Q7S1	2320647M	TRS. 2SC1213 (C/D)
Q851	2315491	TRS. 2SC4544
Q852	2320591M	TRS. 2SC458 (B /C) SI 230MHZ200MW
Q853	2320637M	TRS. 2SA673 (C/D)
Q854	2315491	TRS. 2SC4544
Q855	2320591M	TRS. 2SC458 (B /C) SI 230MHZ200MW
Q856	2320637M	TRS. 2SA673 (C/D) SI 80MHZ 400MW
Q857	2315491	TRS. 2SC4544
Q858	2320591M	TRS. 2SC458 (B /C) SI 230MHZ200MW
Q859	2320637M	TRS. 2SA673 (C/D)
⚠ Q901	2323782R	THYRISTOR 03P2M(TA)
⚠ Q905	2323782R	THYRISTOR 03P2M(TA)
Q907	2320637M	TRS. 2SA673 (C/D)
Q908	2327883M	TRS. 2SA1207 (S/T) SI 150MHZ600MW
Q909	2320637M	TRS. 2SA673 (C 26/D 26)
Q914	2320647M	TRS. 2SC1213 (C 21 /D 21)
Q958	2320647M	TRS. 2SC1213 (C 21 /D 21)
QA01	2320596M	TRS. 2SC458 (C /D) SI 230MHZ200MW
QA02	2320637M	TRS. 2SA673 (C 26/D 26)
QA03	2320637M	TRS. 2SA673 (C 26/D 26)
QA04	2320596M	TRS. 2SC458 (C /D) SI 230MHZ200MW
QN05	2320596M	TRS. 2SC458 (C /D) SI 230MHZ200MW
QN06	2320596M	TRS. 2SC458 (C /D) SI 230MHZ200MW
QN07	2320637M	TRS. 2SA673 (C 26/D 26)
QN08	2320637M	TRS. 2SA673 (C 26/D 26)
QN41	2320596M	TRS. 2SC458 (C /D) SI 230MHZ200MW
QN61	2320596M	TRS. 2SC458 (C /D) SI 230MHZ200MW
QN6A	2320596M	TRS. 2SC458 (C /D) SI 230MHZ200MW
QN6C	2320596M	TRS. 2SC458 (C /D) SI 230MHZ200MW
QN70	2320596M	TRS. 2SC458 (C /D) SI 230MHZ200MW
QN71	2320596M	TRS. 2SC458 (C /D) SI 230MHZ200MW
QN72	2320637M	TRS. 2SA673 (C 26/D 26)
QN73	2320596M	TRS. 2SC458 (C /D) SI 230MHZ200MW
QN74	2320596M	TRS. 2SC458 (C /D) SI 230MHZ200MW
QN75	2320596M	TRS. 2SC458 (C /D) SI 230MHZ200MW
QN90	2323434	TRS. 2SC1983 (O/Y)
QP01	2320596M	TRS. 2SC458 (C /D) SI 230MHZ200MW
QP02	2320596M	TRS. 2SC458 (C /D) SI 230MHZ200MW
QP03	2320596M	TRS. 2SC458 (C /D) SI 230MHZ200MW
QP04	2320596M	TRS. 2SC458 (C /D) SI 230MHZ200MW
QQ01	2320637M	TRS. 2SA673 (C 26/D 26)
QQ06	2320596M	TRS. 2SC458 (C /D) SI 230MHZ200MW
QQ07	2320596M	TRS. 2SC458 (C /D) SI 230MHZ200MW
QQ08	2320596M	TRS. 2SC458 (C /D) SI 230MHZ200MW
QSA1	2320596M	TRS. 2SC458 (C /D) SI 230MHZ200MW
QT11	2320637M	TRS. 2SA673 (C 26/D 26)
QT12	2320637M	TRS. 2SA673 (C 26/D 26)
QT13	2320637M	TRS. 2SA673 (C 26/D 26)
QT14	2320596M	TRS. 2SC458 (C /D) SI 230MHZ200MW
QT15	2320596M	TRS. 2SC458 (C /D) SI 230MHZ200MW
QT16	2320596M	TRS. 2SC458 (C /D) SI 230MHZ200MW
QVC1	2320596M	TRS. 2SC458 (C /D) SI 230MHZ200MW
QVC3	2323526M	TRS. 2SD789 D/E TAPE
QVC4	2323531	TRS. 2SB740 (B/C) SI 65MHZ 0.9W
QW02	2320598M	TRS. 2SC458 (B /C /D)
QW03	2320598M	TRS. 2SC458 (B /C /D)
QW04	2320598M	TRS. 2SC458 (B /C /D)

REPLACEMENT PARTS LIST

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SYMBOL NO.	PART NO.	PART DESCRIPTION
QW04	2320598M	TRS. 2SC458 (B TZ/C TZ/D TZ)
QW05	2320598M	TRS. 2SC458 (B TZ/C TZ/D TZ)
QW06	2320598	TRS. 2SC458 (B/C/D)
QW07	2320647M	TRS. 2SC1213 (C 21 TZ/D 21 TZ) SI 80MHZ400
QW08	2321351M	TRS. 2SA836/844D/E 100MA 200MW 200MHZSI
QW09	2315381	TRS. 2SA1837
QW10	2315391	TRS. 2SC4793
QW11	2320598M	TRS. 2SC458 (B TZ/C TZ/D TZ)
QW12	2320598M	TRS. 2SC458 (B TZ/C TZ/D TZ)
QW13	2320596M	TRS. 2SC458 (C TZ/D TZ) SI 230MHZ200MW
QY44	2320596M	TRS. 2SC458 (C TZ/D TZ) SI 230MHZ200MW
QY45	2320596M	TRS. 2SC458 (C TZ/D TZ) SI 230MHZ200MW
		RESISTORS
R001	0700042M	RES.-CARBON FLM 1/16W 1.2K-JB
R002	0700041M	RES.-CARBON FLM 1/16W 1.0K-JB
R003	0700043M	RES.-CARBON FLM 1/16W 1.5K-JB
R004	0700046M	RES.-CARBON FLM 1/16W 2.7K-JB
R005	0700049M	RES.-CARBON FLM 1/16W 4.7K-JB
R006	0700054M	RES.-CARBON FLM 1/16W 10K-JB
R00A	0700049M	RES.-CARBON FLM 1/16W 4.7K-JB
R00H	0700045M	RES.-CARBON FLM 1/16W 2.2K-JB
R010	0700054M	RES.-CARBON FLM 1/16W 10K-JB
R011	0700058M	RES.-CARBON FLM 1/16W 22K-JB
R012	0700054M	RES.-CARBON FLM 1/16W 10K-JB
R013	0700049M	RES.-CARBON FLM 1/16W 4.7K-JB
R014	0700063M	RES.-CARBON FLM 1/16W 47K-JB
R015	0700054M	RES.-CARBON FLM 1/16W 10K-JB
R016	0700041M	RES.-CARBON FLM 1/16W 1.0K-JB
R017	0700041M	RES.-CARBON FLM 1/16W 1.0K-JB
R018	0700041M	RES.-CARBON FLM 1/16W 1.0K-JB
R01A	0100065M	RES.-CARBON FLM 1/8W 1K-JB
R01C	0700054M	RES.-CARBON FLM 1/16W 10K-JB
R01E	0700054M	RES.-CARBON FLM 1/16W 10K-JB
R01F	0700054M	RES.-CARBON FLM 1/16W 10K-JB
R01G	0700027M	RES.-CARBON FLM 1/16W 100-JB
R01H	0700041M	RES.-CARBON FLM 1/16W 1.0K-JB
R01J	0700054M	RES.-CARBON FLM 1/16W 10K-JB
R01K	0700054M	RES.-CARBON FLM 1/16W 10K-JB
R01L	0700054M	RES.-CARBON FLM 1/16W 10K-JB
R01M	0700032M	RES.-CARBON FLM 1/16W 220-JB
R01N	0700032M	RES.-CARBON FLM 1/16W 220-JB
R01P	0700032M	RES.-CARBON FLM 1/16W 220-JB
R01Q	0700048M	RES.-CARBON FLM 1/16W 3.9K-JB
R01R	0700046M	RES.-CARBON FLM 1/16W 2.7K-JB
R021	0700041M	RES.-CARBON FLM 1/16W 1.0K-JB
R022	0700041M	RES.-CARBON FLM 1/16W 1.0K-JB
R023	0700041M	RES.-CARBON FLM 1/16W 1.0K-JB
R024	0700049M	RES.-CARBON FLM 1/16W 4.7K-JB
R025	0700055M	RES.-CARBON FLM 1/16W 12K-JB
R026	0700041M	RES.-CARBON FLM 1/16W 1.0K-JB
R027	0700041M	RES.-CARBON FLM 1/16W 1.0K-JB
R029	0700041M	RES.-CARBON FLM 1/16W 1.0K-JB
R02A	0700054M	RES.-CARBON FLM 1/16W 10K-JB
R030	0700027M	RES.-CARBON FLM 1/16W 100-JB
R031	0700027M	RES.-CARBON FLM 1/16W 100-JB
R032	0700056M	RES.-CARBON FLM 1/16W 15K-JB
R033	0700041M	RES.-CARBON FLM 1/16W 1.0K-JB
R034	0700036M	RES.-CARBON FLM 1/16W 470-JB
R035	0100129M	RES.-CARBON FLM 1/8W 470K-JB
R036	0100131M	RES.-CARBON FLM 1/8W 560K-JB
R037	0700064M	RES.-CARBON FLM 1/16W 56K-JB
R038	0700041M	RES.-CARBON FLM 1/16W 1.0K-JB
R039	0700041M	RES.-CARBON FLM 1/16W 1.0K-JB
R040	0700041M	RES.-CARBON FLM 1/16W 1.0K-JB
R042	0700041M	RES.-CARBON FLM 1/16W 1.0K-JB
R043	0700041M	RES.-CARBON FLM 1/16W 1.0K-JB
R044	0700027M	RES.-CARBON FLM 1/16W 100-JB
R045	0700027M	RES.-CARBON FLM 1/16W 100-JB
R046	0700027M	RES.-CARBON FLM 1/16W 100-JB
R047	0700027M	RES.-CARBON FLM 1/16W 100-JB
R048	0700051M	RES.-CARBON FLM 1/16W 5.6K-JB
R049	0700041M	RES.-CARBON FLM 1/16W 1.0K-JB
R050	0700041M	RES.-CARBON FLM 1/16W 1.0K-JB
R051	0700049M	RES.-CARBON FLM 1/16W 4.7K-JB
R052	0700049M	RES.-CARBON FLM 1/16W 4.7K-JB
R053	0700049M	RES.-CARBON FLM 1/16W 4.7K-JB
R054	0700049M	RES.-CARBON FLM 1/16W 4.7K-JB
R055	0700054M	RES.-CARBON FLM 1/16W 10K-JB
R056	0700041M	RES.-CARBON FLM 1/16W 1.0K-JB
R058	0700041M	RES.-CARBON FLM 1/16W 1.0K-JB
R059	0700027M	RES.-CARBON FLM 1/16W 100-JB
R05A	0700049M	RES.-CARBON FLM 1/16W 4.7K-JB
R05F	0700049M	RES.-CARBON FLM 1/16W 4.7K-JB
R05G	0700032M	RES.-CARBON FLM 1/16W 220-JB
R060	0700051M	RES.-CARBON FLM 1/16W 5.6K-JB
R061	0700051M	RES.-CARBON FLM 1/16W 5.6K-JB
R062	0700054M	RES.-CARBON FLM 1/16W 10K-JB
R063	0700054M	RES.-CARBON FLM 1/16W 10K-JB
R064	0700054M	RES.-CARBON FLM 1/16W 10K-JB
R065	0700054M	RES.-CARBON FLM 1/16W 10K-JB
R066	0700049M	RES.-CARBON FLM 1/16W 4.7K-JB
R067	0700027M	RES.-CARBON FLM 1/16W 100-JB
R068	0700027M	RES.-CARBON FLM 1/16W 100-JB
R069	0700054M	RES.-CARBON FLM 1/16W 10K-JB
R070	0700054M	RES.-CARBON FLM 1/16W 10K-JB
R070	0700027M	RES.-CARBON FLM 1/16W 100-JB
R071	0700049M	RES.-CARBON FLM 1/16W 4.7K-JB
R071	0700027M	RES.-CARBON FLM 1/16W 100-JB
R072	0700058M	RES.-CARBON FLM 1/16W 22K-JB
R072	0700041M	RES.-CARBON FLM 1/16W 1.0K-JB
R073	0700041M	RES.-CARBON FLM 1/16W 1.0K-JB
R075	0700067M	RES.-CARBON FLM 1/16W 100K-JB
R075	0700041M	RES.-CARBON FLM 1/16W 1.0K-JB
R076	0700054M	RES.-CARBON FLM 1/16W 10K-JB
R077	0700054M	RES.-CARBON FLM 1/16W 10K-JB
R078	0700058M	RES.-CARBON FLM 1/16W 22K-JB
R079	0700041M	RES.-CARBON FLM 1/16W 1.0K-JB
R07A	0700041M	RES.-CARBON FLM 1/16W 1.0K-JB
R07C	0700041M	RES.-CARBON FLM 1/16W 1.0K-JB
R080	0700041M	RES.-CARBON FLM 1/16W 1.0K-JB
R084	0700041M	RES.-CARBON FLM 1/16W 1.0K-JB
R08C	0700032M	RES.-CARBON FLM 1/16W 220-JB
R08D	0100055M	RES.-CARBON FLM 1/8W 390-JB
R08E	0100041M	RES.-CARBON FLM 1/8W 100-JB
R090	0100121M	RES.-CARBON FLM 1/8W 220K-JB
R091	0700055M	RES.-CARBON FLM 1/16W 12K-JB
R092	0700054M	RES.-CARBON FLM 1/16W 10K-JB
R096	0700054M	RES.-CARBON FLM 1/16W 10K-JB
R097	0700054M	RES.-CARBON FLM 1/16W 10K-JB
R099	0700041M	RES.-CARBON FLM 1/16W 1.0K-JB

REPLACEMENT PARTS LIST

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SYMBOL NO.	PART NO.	PART DESCRIPTION
R099A	0700041M	RES.-CARBON FLM 1/16W 1.0K-JB
R100	0700058M	RES.-CARBON FLM 1/16W 22K-JB
R103	0114131M	RES.-CARBON FLM 1/4W 100-JB
R206	0700036M	RES.-CARBON FLM 1/16W 470-JB
R207	0700036M	RES.-CARBON FLM 1/16W 470-JB
R208	0700027M	RES.-CARBON FLM 1/16W 100-JB
R209	0700045M	RES.-CARBON FLM 1/16W 2.2K-JB
R210	0100121M	RES.-CARBON FLM 1/8W 220K-JB
R212	0100131M	RES.-CARBON FLM 1/8W 560K-JB
R213	0700051M	RES.-CARBON FLM 1/16W 5.6K-JB
R240	0700036M	RES.-CARBON FLM 1/16W 470-JB
R241	0700027M	RES.-CARBON FLM 1/16W 100-JB
R242	0700037M	RES.-CARBON FLM 1/16W 560-JB
R243	0700043M	RES.-CARBON FLM 1/16W 1.5K-JB
R244	0700033M	RES.-CARBON FLM 1/16W 270-JB
R246	0100057M	RES.-CARBON FLM 1/8W 470-JB
R247	0100057M	RES.-CARBON FLM 1/8W 470-JB
R248	0700041M	RES.-CARBON FLM 1/16W 1.0K-JB
R271	0700058M	RES.-CARBON FLM 1/16W 22K-JB
R272	0700058M	RES.-CARBON FLM 1/16W 22K-JB
R301	0700054M	RES.-CARBON FLM 1/16W 10K-JB
R302	0700058M	RES.-CARBON FLM 1/16W 22K-JB
R303	0700031M	RES.-CARBON FLM 1/16W 180-JB
R305	0700041M	RES.-CARBON FLM 1/16W 1.0K-JB
R306	0700051M	RES.-CARBON FLM 1/16W 5.6K-JB
R307	0700048M	RES.-CARBON FLM 1/16W 3.9K-JB
R332	0100041M	RES.-CARBON FLM 1/8W 100-JB
R333	0100038M	RES.-CARBON FLM 1/8W 75-JB
R381	0700032M	RES.-CARBON FLM 1/16W 220-JB
R382	0114141M	RES.-CARBON FLM 1/4W 270-JB
R383	0100041M	RES.-CARBON FLM 1/8W 100-JB
R384	0700054M	RES.-CARBON FLM 1/16W 10K-JB
R3Y1	0100038M	RES.-CARBON FLM 1/8W 75-JB
R3Y2	0100041M	RES.-CARBON FLM 1/8W 100-JB
R402	0700041M	RES.-CARBON FLM 1/16W 1.0K-JB
R405	0700033M	RES.-CARBON FLM 1/16W 270-JB
R406	0700033M	RES.-CARBON FLM 1/16W 270-JB
R407	0700045M	RES.-CARBON FLM 1/16W 2.2K-JB
R408	0700045M	RES.-CARBON FLM 1/16W 2.2K-JB
R410	0100065M	RES.-CARBON FLM 1/8W 1K-JB
R411	0100065M	RES.-CARBON FLM 1/8W 1K-JB
R413	0700051M	RES.-CARBON FLM 1/16W 5.6K-JB
R414	0700054M	RES.-CARBON FLM 1/16W 10K-JB
R415	0700054M	RES.-CARBON FLM 1/16W 10K-JB
R416	0700054M	RES.-CARBON FLM 1/16W 10K-JB
R417	0700054M	RES.-CARBON FLM 1/16W 10K-JB
R419	0100051M	RES.-CARBON FLM 1/8W 270-JB
R440	0700049M	RES.-CARBON FLM 1/16W 4.7K-JB
R441	0700049M	RES.-CARBON FLM 1/16W 4.7K-JB
R447	0700065M	RES.-CARBON FLM 1/16W 68K-JB
R448	0700041M	RES.-CARBON FLM 1/16W 1.0K-JB
R449	0187076M	RES.-CARBON FLM 1/16W 3.0K-JB
R450	0187082M	RES.-CARBON FLM 1/16W 5.1K-JB
R451	0119636M	RES.-MTL FLM 1/8W 16K-FB
R452	0700036M	RES.-CARBON FLM 1/16W 470-JB
R453	0700036M	RES.-CARBON FLM 1/16W 470-JB
R454	0700037M	RES.-CARBON FLM 1/16W 560-JB
R457	0700027M	RES.-CARBON FLM 1/16W 100-JB
R458	0700027M	RES.-CARBON FLM 1/16W 100-JB
R459	0100121M	RES.-CARBON FLM 1/8W 220K-JB

SYMBOL NO.	PART NO.	PART DESCRIPTION
R45F	0100133M	RES.-CARBON FLM 1/8W 680K-JB
R461	0700045M	RES.-CARBON FLM 1/16W 2.2K-JB
R462	0700041M	RES.-CARBON FLM 1/16W 1.0K-JB
R463	0700041M	RES.-CARBON FLM 1/16W 1.0K-JB
R466	0700032M	RES.-CARBON FLM 1/16W 220-JB
R467	0700032M	RES.-CARBON FLM 1/16W 220-JB
⚠ R468	0119505S	RES.-MTL FLM 1/4W 2.2-J
R472	0100113M	RES.-CARBON FLM 1/8W 100K-JB
R473	0100065M	RES.-CARBON FLM 1/8W 1K-JB
R474	0100113M	RES.-CARBON FLM 1/8W 100K-JB
R475	0100065M	RES.-CARBON FLM 1/8W 1K-JB
R476	0100065M	RES.-CARBON FLM 1/8W 1K-JB
R477	0100113M	RES.-CARBON FLM 1/8W 100K-JB
R478	0100065M	RES.-CARBON FLM 1/8W 1K-JB
R479	0100113M	RES.-CARBON FLM 1/8W 100K-JB
⚠ R480	0119505S	RES.-MTL FLM 1/4W 2.2-J
R482	0700063M	RES.-CARBON FLM 1/16W 47K-JB
R483	0700063M	RES.-CARBON FLM 1/16W 47K-JB
R485	0700063M	RES.-CARBON FLM 1/16W 47K-JB
R486	0700063M	RES.-CARBON FLM 1/16W 47K-JB
R488	0700063M	RES.-CARBON FLM 1/16W 47K-JB
R489	0700054M	RES.-CARBON FLM 1/16W 10K-JB
R48A	0700027M	RES.-CARBON FLM 1/16W 100-JB
R48C	0700027M	RES.-CARBON FLM 1/16W 100-JB
R48E	0700054M	RES.-CARBON FLM 1/16W 10K-JB
R48F	0700054M	RES.-CARBON FLM 1/16W 10K-JB
R490	0700054M	RES.-CARBON FLM 1/16W 10K-JB
R491	0700054M	RES.-CARBON FLM 1/16W 10K-JB
R492	0700054M	RES.-CARBON FLM 1/16W 10K-JB
R493	0700063M	RES.-CARBON FLM 1/16W 47K-JB
R495	0700063M	RES.-CARBON FLM 1/16W 47K-JB
R496	0700063M	RES.-CARBON FLM 1/16W 47K-JB
R4XX	0700034M	RES.-CARBON FLM 1/16W 330-JB
R501	0700063M	RES.-CARBON FLM 1/16W 47K-JB
R502	0700041M	RES.-CARBON FLM 1/16W 1.0K-JB
R503	0700041M	RES.-CARBON FLM 1/16W 1.0K-JB
R504	0700027M	RES.-CARBON FLM 1/16W 100-JB
R505	0700047M	RES.-CARBON FLM 1/16W 3.3K-JB
R506	0114141M	RES.-CARBON FLM 1/4W 270-JB
R507	0700043M	RES.-CARBON FLM 1/16W 1.5K-JB
R508	0700043M	RES.-CARBON FLM 1/16W 1.5K-JB
R509	0700043M	RES.-CARBON FLM 1/16W 1.5K-JB
R516	0700066M	RES.-CARBON FLM 1/16W 82K-JB
R525	0700044M	RES.-CARBON FLM 1/16W 1.8K-JB
R526	0700044M	RES.-CARBON FLM 1/16W 1.8K-JB
R527	0700044M	RES.-CARBON FLM 1/16W 1.8K-JB
R553	0700038M	RES.-CARBON FLM 1/16W 680-JB
R554	0700054M	RES.-CARBON FLM 1/16W 10K-JB
R555	0700041M	RES.-CARBON FLM 1/16W 1.0K-JB
R556	0700054M	RES.-CARBON FLM 1/16W 10K-JB
R557	0700027M	RES.-CARBON FLM 1/16W 100-JB
R558	0700027M	RES.-CARBON FLM 1/16W 100-JB
R559	0700044M	RES.-CARBON FLM 1/16W 1.8K-JB
R560	0700044M	RES.-CARBON FLM 1/16W 1.8K-JB
R561	0700044M	RES.-CARBON FLM 1/16W 1.8K-JB
R563	0700054M	RES.-CARBON FLM 1/16W 10K-JB
R564	0700046M	RES.-CARBON FLM 1/16W 2.7K-JB
R565	0700047M	RES.-CARBON FLM 1/16W 3.3K-JB
R566	0700034M	RES.-CARBON FLM 1/16W 330-JB
R567	0700045M	RES.-CARBON FLM 1/16W 2.2K-JB

REPLACEMENT PARTS LIST

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SYMBOL NO.	PART NO.	PART DESCRIPTION
R568	0700053M	RES.-CARBON FLM 1/16W 8.2K-JB
R569	0700027M	RES.-CARBON FLM 1/16W 100-JB
R570	0700036M	RES.-CARBON FLM 1/16W 470-JB
R571	0700027M	RES.-CARBON FLM 1/16W 100-JB
R572	0100065M	RES.-CARBON FLM 1/8W 1K-JB
R573	0100065M	RES.-CARBON FLM 1/8W 1K-JB
R574	0100065M	RES.-CARBON FLM 1/8W 1K-JB
R591	0700032M	RES.-CARBON FLM 1/16W 220-JB
R592	0700032M	RES.-CARBON FLM 1/16W 220-JB
R593	0700032M	RES.-CARBON FLM 1/16W 220-JB
R595	0700041M	RES.-CARBON FLM 1/16W 1.0K-JB
R59A	0100049M	RES.-CARBON FLM 1/8W 220-JB
R5C1	0100038M	RES.-CARBON FLM 1/8W 75-JB
R5C2	0100041M	RES.-CARBON FLM 1/8W 100-JB
R5J8	0700045M	RES.-CARBON FLM 1/16W 2.2K-JB
R5J9	0700061M	RES.-CARBON FLM 1/16W 33K-JB
R5L2	0700027M	RES.-CARBON FLM 1/16W 100-JB
R5L3	0700024M	RES.-CARBON FLM 1/16W 56-J
R5L4	0700027M	RES.-CARBON FLM 1/16W 100-JB
R5L5	0700024M	RES.-CARBON FLM 1/16W 56-J
R5L6	0700027M	RES.-CARBON FLM 1/16W 100-JB
R5L7	0700024M	RES.-CARBON FLM 1/16W 56-J
R5L8	0700041M	RES.-CARBON FLM 1/16W 1.0K-JB
R5L9	0700041M	RES.-CARBON FLM 1/16W 1.0K-JB
R5M1	0700041M	RES.-CARBON FLM 1/16W 1.0K-JB
R5M3	0700041M	RES.-CARBON FLM 1/16W 1.0K-JB
R5N1	0700047M	RES.-CARBON FLM 1/16W 3.3K-JB
R601	0700055M	RES.-CARBON FLM 1/16W 12K-JB
R605	0700067M	RES.-CARBON FLM 1/16W 100K-JB
R609	0119732M	RES.-METAL OXIDE FILM 1.2-JB
R60E	0700041M	RES.-CARBON FLM 1/16W 1.0K-JB
R611	0700055M	RES.-CARBON FLM 1/16W 12K-JB
R612	0700041M	RES.-CARBON FLM 1/16W 1.0K-JB
R613A	0700034M	RES.-CARBON FLM 1/16W 330-JB
R614	0700061M	RES.-CARBON FLM 1/16W 33K-JB
R616	0700054M	RES.-CARBON FLM 1/16W 10K-JB
R618	0700059M	RES.-CARBON FLM 1/16W 27K-JB
R61E	0700041M	RES.-CARBON FLM 1/16W 1.0K-JB
R61W	0700046M	RES.-CARBON FLM 1/16W 2.7K-JB
R626	0700047M	RES.-CARBON FLM 1/16W 3.3K-JB
R627	0700047M	RES.-CARBON FLM 1/16W 3.3K-JB
R628	0187088M	RES.-CARBON FLM 1/16W 9.1K-JB
R629	0700058M	RES.-CARBON FLM 1/16W 22K-JB
R62E	0700057M	RES.-CARBON FLM 1/16W 18K-JB
R62W	0700058M	RES.-CARBON FLM 1/16W 22K-JB
R630	0700053M	RES.-CARBON FLM 1/16W 8.2K-JB
R631	0700046M	RES.-CARBON FLM 1/16W 2.7K-JB
R632	0700048M	RES.-CARBON FLM 1/16W 3.9K-JB
R633	0700057M	RES.-CARBON FLM 1/16W 18K-JB
R634	0700051M	RES.-CARBON FLM 1/16W 5.6K-JB
R635	0114177M	RES.-CARBON FILM SRD 1/4 P 4.7K-J
R636	0100075M	RES.-CARBON FLM 1/8W 2.7K-JB
R637	0700046M	RES.-CARBON FLM 1/16W 2.7K-JB
R63E	0700057M	RES.-CARBON FLM 1/16W 18K-JB
⚠ R642	⚠2340371	THERMISTOR 112301-9
R64E	0700066M	RES.-CARBON FLM 1/16W 82K-JB
R651	0700027M	RES.-CARBON FLM 1/16W 100-JB
R652	0113733M	RES. CARBON FILM SRD1/2P-B 220-J
R65E	0700057M	RES.-CARBON FLM 1/16W 18K-JB
R671	0110219S	RES.-MTL OXIDE FLM 82-JS
R672	0110219S	RES.-MTL OXIDE FLM 82-JS
R69W	0700047M	RES.-CARBON FLM 1/16W 3.3K-JB
R701	0100111M	RES.-CARBON FLM 1/8W 82K-JB
R701A	0100109M	RES.-CARBON FLM 1/8W 68K-JB
R702	0100041M	RES.-CARBON FLM 1/8W 100-JB
⚠ R706	0700045M	RES.-CARBON FLM 1/16W 2.2K-JB
⚠ R707	0100097M	RES.-CARBON FLM 1/8W 22K-JB
R70A	0110225S	RES.MTL OXIDE FLM 150-JS 2W
R70C	0110225S	RES.MTL OXIDE FLM 150-JS 2W
R710	0114143M	RES.-CARBON FLM 1/4W 330-JB
R711	0100065M	RES.-CARBON FLM 1/8W 1K-JB
⚠ R712	0700041M	RES.-CARBON FLM 1/16W 1.0K-JB
⚠ R713	0700047M	RES.-CARBON FLM 1/16W 3.3K-JB
R719	0113750M	RES.-CARBON FLM 1/2W 1K-JB
R721	AT00334S	RES.MTL OXIDE FLM 3W 120 OHM
R724	0147774	RES.WW 10W 470 OHM CEMENTED
R726	0100077M	RES.-CARBON FLM 1/8W 3.3K-JB
R728	0113758M	RES.-CARBON FLM 1/2W 2.2K-JB
R72H	0100025M	RES.-CARBON FLM 1/8W 22-JB
R734	0100089M	RES.-CARBON FLM 1/8W 10K-JB
R735	0700047M	RES.-CARBON FLM 1/16W 3.3K-JB
R736	0700041M	RES.-CARBON FLM 1/16W 1.0K-JB
R73H	0114131M	RES.-CARBON FLM 1/4W 100-JB
R741	0110245S	RES.-MTL OXIDE FLM 1.0K-JS
R742	0114145M	RES.-CARBON FILM SRD 1/4 P 390-J
R743	0113727M	RES. CARBON FILM SRD1/2P-B 120-J
R744	0100063M	RES.-CARBON FLM 1/8W 820-JB
⚠ R745	0100037M	RES.-CARBON FLM 1/8W 68-JB
R746	0110263S	RES.-MTL OXIDE FLM 5.6K-JS
⚠ R74A	AT00425S	RES.MTL OXIDE FLM 2W 0.33 OHM
⚠ R74C	AT00425S	RES.MTL OXIDE FLM 2W 0.33 OHM
R74D	0119691M	RES.-MTL FLM 1W 0.33JB
⚠ R74E	AT00425S	RES.MTL OXIDE FLM 2W 0.33 OHM
⚠ R74F	AT00425S	RES.MTL OXIDE FLM 2W 0.33 OHM
R74G	0119691M	RES.-MTL FLM 1W 0.33JB
R74H	0119691M	RES.-MTL FLM 1W 0.33JB
R74J	0119691M	RES.-MTL FLM 1W 0.33JB
R751	0700034M	RES.-CARBON FLM 1/16W 330-JB
R751A	0700049M	RES.-CARBON FLM 1/16W 4.7K-JB
R751B	0700049M	RES.-CARBON FLM 1/16W 4.7K-JB
R752	0700043M	RES.-CARBON FLM 1/16W 1.5K-JB
R752A	0700054M	RES.-CARBON FLM 1/16W 10K-JB
R752B	0700054M	RES.-CARBON FLM 1/16W 10K-JB
R753	0700034M	RES.-CARBON FLM 1/16W 330-JB
R753A	0700054M	RES.-CARBON FLM 1/16W 10K-JB
R753B	0700054M	RES.-CARBON FLM 1/16W 10K-JB
R756	0700031M	RES.-CARBON FLM 1/16W 180-JB
R757	0100029M	RES.-CARBON FLM 1/8W 33-JB
R757A	0700054M	RES.-CARBON FLM 1/16W 10K-JB
R757B	0700054M	RES.-CARBON FLM 1/16W 10K-JB
R762	0100051M	RES.-CARBON FLM 1/8W 270-JB
R763	0100025M	RES.-CARBON FLM 1/8W 22-JB
R764	0100075M	RES.-CARBON FLM 1/8W 2.7K-JB
R765	0100077M	RES.-CARBON FLM 1/8W 3.3K-JB
R767	0100025M	RES.-CARBON FLM 1/8W 22-JB
R768	0700058M	RES.-CARBON FLM 1/16W 22K-JB
R769	0700061M	RES.-CARBON FLM 1/16W 33K-JB
R771	0114131M	RES.-CARBON FLM 1/4W 100-JB
R772	0100113M	RES.-CARBON FLM 1/8W 100K-JB
R773	0114219M	RES.-CARBON FLM 1/4W 56K-JB

REPLACEMENT PARTS LIST

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SYMBOL NO.	PART NO.	PART DESCRIPTION
R774	0700054M	RES.-CARBON FLM 1/16W 10K-JB
R774	0100113M	RES.-CARBON FLM 1/8W 100K-JB
R775	0100105M	RES.-CARBON FLM 1/8W 47K-JB
R776	0700059M	RES.-CARBON FLM 1/16W 27K-JB
R777	0700044M	RES.-CARBON FLM 1/16W 1.8K-JB
R778	0700049M	RES.-CARBON FLM 1/16W 4.7K-JB
R779	0700044M	RES.-CARBON FLM 1/16W 1.8K-JB
R780	0700063M	RES.-CARBON FLM 1/16W 47K-JB
R781	0700047M	RES.-CARBON FLM 1/16W 3.3K-JB
R782	0700046M	RES.-CARBON FLM 1/16W 2.7K-JB
R783	0700054M	RES.-CARBON FLM 1/16W 10K-JB
R783	0113729M	RES.-CARBON FLM 1/2W 150-JB
R784	0700058M	RES.-CARBON FLM 1/16W 22K-JB
R784	0113729M	RES.-CARBON FLM 1/2W 150-JB
R785	0100041M	RES.-CARBON FLM 1/8W 100-JB
R785	0100053M	RES.-CARBON FLM 1/8W 330-JB
R786	0100073M	RES.-CARBON FLM 1/8W 2.2K-JB
R786	0100061M	RES.-CARBON FLM 1/8W 680-JB
R787	0100073M	RES.-CARBON FLM 1/8W 2.2K-JB
⚠ R787	AT00958F	RES.MTL OXIDE FLM 7W 120 OHM
⚠ R788	AT00958F	RES.MTL OXIDE FLM 7W 120 OHM
⚠ R789	AT00961F	RES.MTL OXIDE FLM 7W 180 OHM
R78A	0700054M	RES.-CARBON FLM 1/16W 10K-JB
⚠ R791	AW00096	TRIMMER RES.
R793	0113750M	RES.-CARBON FLM 1/2W 1K-JB
R794	0113768M	RES.-CARBON FLM SRD1/2P-B
R7NQ	0700047M	RES.-CARBON FLM 1/16W 3.3K-JB
R7S1	0700054M	RES.-CARBON FLM 1/16W 10K-JB
R7S2	0700063M	RES.-CARBON FLM 1/16W 47K-JB
R7S3	0114153M	RES.-CARBON FILM 1/4W 820-JB
R801	0100053M	RES.-CARBON FLM 1/8W 330-JB
R805	0700009M	RES.-CARBON FLM 1/16W 4.7-J
R806	0700021M	RES.-CARBON FLM 1/16W 33-J
R807	0700016M	RES.-CARBON FLM 1/16W 15-J
R821	0114175M	RES.-CARBON FILM SRD 1/4 P 3.9K-J
R822	0114175M	RES.-CARBON FILM SRD 1/4 P 3.9K-J
R823	0114175M	RES.-CARBON FILM SRD 1/4 P 3.9K-J
R851	0140932S	RSL-392J7WS(BSR-Z)
R852	0140932S	RSL-392J7WS(BSR-Z)
R853	0140932S	RSL-392J7WS(BSR-Z)
R854	0113744M	RES. CARBON FILM SRD1/2P-B 560-J
R855	0113744M	RES. CARBON FILM SRD1/2P-B 560-J
R856	0113744M	RES. CARBON FILM SRD1/2P-B 560-J
R857	0100053M	RES.-CARBON FLM 1/8W 330-JB
R858	0100053M	RES.-CARBON FLM 1/8W 330-JB
R860	0150108	RES.-VARIABLE RV6 100-B
R861	0700019M	RES.-CARBON FLM 1/16W 27-J
R863	0700022M	RES.-CARBON FLM 1/16W 39-J
R864	0150108	RES.-VARIABLE RV6 100-B
R865	0700019M	RES.-CARBON FLM 1/16W 27-J
R866	AW00074	TRIMMER RES.
R867	0700031M	RES.-CARBON FLM 1/16W 180-JB
R868	AW00074	TRIMMER RES.
R869	0700031M	RES.-CARBON FLM 1/16W 180-JB
R870	AW00074	TRIMMER RES.
R871	0700031M	RES.-CARBON FLM 1/16W 180-JB
R875	0100049M	RES.-CARBON FLM 1/8W 220-JB
R876	0100049M	RES.-CARBON FLM 1/8W 220-JB
R877	0100049M	RES.-CARBON FLM 1/8W 220-JB
R878	0100055M	RES.-CARBON FLM 1/8W 390-JB
R879	0100055M	RES.-CARBON FLM 1/8W 390-JB
R880	0100055M	RES.-CARBON FLM 1/8W 390-JB
R886	0700038M	RES.-CARBON FLM 1/16W 680-JB
R889	0114131M	RES.-CARBON FLM 1/4W 100-JB
R890	0114131M	RES.-CARBON FLM 1/4W 100-JB
R891	0114131M	RES.-CARBON FLM 1/4W 100-JB
R892	0700021M	RES.-CARBON FLM 1/16W 33-J
R901	0144151	RES.-WIRE WOUND 33-J
⚠ R902	2341261	THERMISTOR
R905A	0113774M	RES. CARBON FILM SRD1/2P-B 10K-J
R905B	0113774M	RES. CARBON FILM SRD1/2P-B 10K-J
⚠ R906	0147811	RES. -WIRE WOUND 15W 1.5-KM
⚠ R907	0700054M	RES.-CARBON FLM 1/16W 10K-JB
R910	0114041M	RES.-CARBON FILM SRD 1/4P 10J
R916A	0119688M	RES.-MTL FLM 1W 0.22-JB
R916B	0119688M	RES.-MTL FLM 1W 0.22-JB
R924	0114179M	RES.-CARBON FILM SRD 1/4 PF 5.6K-J
R925	0114165M	RES.-CARBON FILM SRD 1/4 PF 1.5K-J
R926	0114165M	RES.-CARBON FILM SRD 1/4 PF 1.5K-J
R927	0114173M	RES.-CARBON FILM SRD1/4PB 3300-J
R928	0700038M	RES.-CARBON FLM 1/16W 680-JB
R929	0100041M	RES.-CARBON FLM 1/8W 100-JB
R930	0100113M	RES.-CARBON FLM 1/8W 100K-JB
R931	0119688M	RES.-MTL FLM 1W 0.22-JB
R932	0700043M	RES.-CARBON FLM 1/16W 1.5K-JB
R933	0700046M	RES.-CARBON FLM 1/16W 2.7K-JB
R939	0110225S	RES.MTL OXIDE FLM 150-JS 2W
R945	0700041M	RES.-CARBON FLM 1/16W 1.0K-JB
R946	0100091M	RES.-CARBON FLM 1/8W 12K-JB
R947	0700027M	RES.-CARBON FLM 1/16W 100-JB
R948	0119695M	RES.-MTL OXIDE FLM 1W 0.47-F
R949	0700043M	RES.-CARBON FLM 1/16W 1.5K-JB
R94A	0114219M	RES.-CARBON FLM 1/4W 56K-JB
R94C	0114209M	RES.-CARBON FILM SRD 1/4 PF 22K-J
R950	0110279S	RES.-MTL OXIDE FLM 27K-JS
R951	0110279S	RES.-MTL OXIDE FLM 27K-JS
R952	0119690M	RES.-METAL FILM 0.27-JB
R954	0700043M	RES.-CARBON FLM 1/16W 1.5K-JB
R958	0100065M	RES.-CARBON FLM 1/8W 1K-JB
R959	0700064M	RES.-CARBON FLM 1/16W 56K-JB
R962	0700046M	RES.-CARBON FLM 1/16W 2.7K-JB
R963	0700059M	RES.-CARBON FLM 1/16W 27K-JB
⚠ R976	0700054M	RES.-CARBON FLM 1/16W 10K-JB
⚠ R977	0700027M	RES.-CARBON FLM 1/16W 100-JB
⚠ R978	0700027M	RES.-CARBON FLM 1/16W 100-JB
⚠ R979	0700041M	RES.-CARBON FLM 1/16W 1.0K-JB
⚠ R982	0700045M	RES.-CARBON FLM 1/16W 2.2K-JB
R984	0100071M	RES.-CARBON FLM 1/8W 1.8K-JB
RA18	0700057M	RES.-CARBON FLM 1/16W 18K-JB
RA19	0700055M	RES.-CARBON FLM 1/16W 12K-JB
RA20	0700041M	RES.-CARBON FLM 1/16W 1.0K-JB
RA21	0700042M	RES.-CARBON FLM 1/16W 1.2K-JB
RA22	0700039M	RES.-CARBON FLM 1/16W 820-JB
RA24	0700057M	RES.-CARBON FLM 1/16W 18K-JB
RA25	0700055M	RES.-CARBON FLM 1/16W 12K-JB
RA26	0700041M	RES.-CARBON FLM 1/16W 1.0K-JB
RA27	0700042M	RES.-CARBON FLM 1/16W 1.2K-JB
RA28	0700039M	RES.-CARBON FLM 1/16W 820-JB
RA41	0100041M	RES.-CARBON FLM 1/8W 100-JB
RA42	0100041M	RES.-CARBON FLM 1/8W 100-JB

REPLACEMENT PARTS LIST

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SYMBOL NO.	PART NO.	PART DESCRIPTION
RK109	0700061M	RES.-CARBON FLM 1/16W 33K-JB
RK187	0100065M	RES.-CARBON FLM 1/8W 1K-JB
RK276	0700061M	RES.-CARBON FLM 1/16W 33K-JB
⚠RK328	0119505S	RES.-MTL FLM 1/4W 2.2-J
RL857	0100031M	RES.-CARBON FLM 1/8W 39-JB
RL858	0100031M	RES.-CARBON FLM 1/8W 39-JB
RL859	0100031M	RES.-CARBON FLM 1/8W 39-JB
RMS1	0100041M	RES.-CARBON FLM 1/8W 100-JB
RMS2	0100041M	RES.-CARBON FLM 1/8W 100-JB
RN09	0700049M	RES.-CARBON FLM 1/16W 4.7K-JB
RN10	0700054M	RES.-CARBON FLM 1/16W 10K-JB
RN13	0700063M	RES.-CARBON FLM 1/16W 47K-JB
RN17	0700054M	RES.-CARBON FLM 1/16W 10K-JB
RN18	0700054M	RES.-CARBON FLM 1/16W 10K-JB
RN21	0700036M	RES.-CARBON FLM 1/16W 470-JB
RN22	0700049M	RES.-CARBON FLM 1/16W 4.7K-JB
RN23	0700027M	RES.-CARBON FLM 1/16W 100-JB
RN24	0700027M	RES.-CARBON FLM 1/16W 100-JB
RN25	0700027M	RES.-CARBON FLM 1/16W 100-JB
RN26	0700027M	RES.-CARBON FLM 1/16W 100-JB
RN27	0700057M	RES.-CARBON FLM 1/16W 18K-JB
RN28	0700045M	RES.-CARBON FLM 1/16W 2.2K-JB
RN29	0700057M	RES.-CARBON FLM 1/16W 18K-JB
RN30	0700045M	RES.-CARBON FLM 1/16W 2.2K-JB
RN35	0700049M	RES.-CARBON FLM 1/16W 4.7K-JB
RN36	0700049M	RES.-CARBON FLM 1/16W 4.7K-JB
RN37	0700051M	RES.-CARBON FLM 1/16W 5.6K-JB
RN38	0700051M	RES.-CARBON FLM 1/16W 5.6K-JB
RN40	0700027M	RES.-CARBON FLM 1/16W 100-JB
RN41	0700049M	RES.-CARBON FLM 1/16W 4.7K-JB
RN42	0700049M	RES.-CARBON FLM 1/16W 4.7K-JB
RN43	0700054M	RES.-CARBON FLM 1/16W 10K-JB
RN44	0700054M	RES.-CARBON FLM 1/16W 10K-JB
RN45	0119635M	RES.-MTL FLM 1/8W 15K-FB
RN45A	0119635M	RES.-MTL FLM 1/8W 15K-FB
RN46	0119647M	RES.-MTL FLM 1/8W 47K-FB
RN49	0700049M	RES.-CARBON FLM 1/16W 4.7K-JB
RN4M	0700045M	RES.-CARBON FLM 1/16W 2.2K-JB
RN50	0700057M	RES.-CARBON FLM 1/16W 18K-JB
RN51	0119645M	RES.-MTL FLM 1/8W 39K-FB
RN53	0119625M	RES.-MTL FLM 1/8W 5.6K-FB
RN54	0700045M	RES.-CARBON FLM 1/16W 2.2K-JB
RN61	0700063M	RES.-CARBON FLM 1/16W 47K-JB
RN62	0700063M	RES.-CARBON FLM 1/16W 47K-JB
RN64	0700041M	RES.-CARBON FLM 1/16W 1.0K-JB
RN65	0100053M	RES.-CARBON FLM 1/8W 330-JB
RN66	0100053M	RES.-CARBON FLM 1/8W 330-JB
RN6A	0700063M	RES.-CARBON FLM 1/16W 47K-JB
RN6C	0700063M	RES.-CARBON FLM 1/16W 47K-JB
RN6E	0700041M	RES.-CARBON FLM 1/16W 1.0K-JB
RN6G	0700041M	RES.-CARBON FLM 1/16W 1.0K-JB
RN6H	0700045M	RES.-CARBON FLM 1/16W 2.2K-JB
RN6J	0700063M	RES.-CARBON FLM 1/16W 47K-JB
RN6M	0700063M	RES.-CARBON FLM 1/16W 47K-JB
RN6N	0700043M	RES.-CARBON FLM 1/16W 1.5K-JB
RN70	0700063M	RES.-CARBON FLM 1/16W 47K-JB
RN71	0700063M	RES.-CARBON FLM 1/16W 47K-JB
RN72	0700063M	RES.-CARBON FLM 1/16W 47K-JB
RN73	0700063M	RES.-CARBON FLM 1/16W 47K-JB
RN74	0700063M	RES.-CARBON FLM 1/16W 47K-JB
RN75	0100121M	RES.-CARBON FLM 1/8W 220K-JB
RN77	0700066M	RES.-CARBON FLM 1/16W 82K-JB
RN78	0700063M	RES.-CARBON FLM 1/16W 47K-JB
RN79	0700063M	RES.-CARBON FLM 1/16W 47K-JB
RN7A	AW00106	TRIMMER RES.
RN7C	0700054M	RES.-CARBON FLM 1/16W 10K-JB
RN7E	0700049M	RES.-CARBON FLM 1/16W 4.7K-JB
RN7F	0700046M	RES.-CARBON FLM 1/16W 2.7K-JB
RN7G	0700051M	RES.-CARBON FLM 1/16W 5.6K-JB
RN7H	0700051M	RES.-CARBON FLM 1/16W 5.6K-JB
RN7J	0700051M	RES.-CARBON FLM 1/16W 5.6K-JB
RN7K	0700062M	RES.-CARBON FLM 1/16W 39K-JB
RN7L	0700054M	RES.-CARBON FLM 1/16W 10K-JB
RN7R	0100035M	RES.-CARBON FLM 1/8W 56-JB
RN7S	0700053M	RES.-CARBON FLM 1/16W 8.2K-JB
RN7T	0700052M	RES.-CARBON FLM 1/16W 6.8K-JB
RN7W	0700054M	RES.-CARBON FLM 1/16W 10K-JB
RN7X	0700054M	RES.-CARBON FLM 1/16W 10K-JB
RN80	0700046M	RES.-CARBON FLM 1/16W 2.7K-JB
⚠ RN87	AW00103	TRIMMER RES.
RN88A	0700055M	RES.-CARBON FLM 1/16W 12K-JB
RN88C	0700044M	RES.-CARBON FLM 1/16W 1.8K-JB
RN8C	0700056M	RES.-CARBON FLM 1/16W 15K-JB
RN8D	0700062M	RES.-CARBON FLM 1/16W 39K-JB
RN8E	0700045M	RES.-CARBON FLM 1/16W 2.2K-JB
RN8F	0700063M	RES.-CARBON FLM 1/16W 47K-JB
RN8G	0700048M	RES.-CARBON FLM 1/16W 3.9K-JB
RN8H	0700027M	RES.-CARBON FLM 1/16W 100-JB
RN92	0100051M	RES.-CARBON FLM 1/8W 270-JB
RN93	0100041M	RES.-CARBON FLM 1/8W 100-JB
RP01	0700059M	RES.-CARBON FLM 1/16W 27K-JB
RP02	0700056M	RES.-CARBON FLM 1/16W 15K-JB
RP03	0700059M	RES.-CARBON FLM 1/16W 27K-JB
RP04	0700056M	RES.-CARBON FLM 1/16W 15K-JB
RP05	0700059M	RES.-CARBON FLM 1/16W 27K-JB
RP06	0700056M	RES.-CARBON FLM 1/16W 15K-JB
RP07	0700052M	RES.-CARBON FLM 1/16W 6.8K-JB
RP08	0700058M	RES.-CARBON FLM 1/16W 22K-JB
RP09	0700058M	RES.-CARBON FLM 1/16W 22K-JB
RP13	0700058M	RES.-CARBON FLM 1/16W 22K-JB
RP14	0700058M	RES.-CARBON FLM 1/16W 22K-JB
RP15	0700058M	RES.-CARBON FLM 1/16W 22K-JB
RP16	0700058M	RES.-CARBON FLM 1/16W 22K-JB
RP17	0700058M	RES.-CARBON FLM 1/16W 22K-JB
RP18	0700058M	RES.-CARBON FLM 1/16W 22K-JB
RP51	0700059M	RES.-CARBON FLM 1/16W 27K-JB
RP52	0700059M	RES.-CARBON FLM 1/16W 27K-JB
RP53	0700059M	RES.-CARBON FLM 1/16W 27K-JB
RR01	0700063M	RES.-CARBON FLM 1/16W 47K-JB
RR02	0700027M	RES.-CARBON FLM 1/16W 100-JB
RR03	0700038M	RES.-CARBON FLM 1/16W 680-JB
RR07	0700054M	RES.-CARBON FLM 1/16W 10K-JB
RR08	0700058M	RES.-CARBON FLM 1/16W 22K-JB
RR09	0700041M	RES.-CARBON FLM 1/16W 1.0K-JB
RR41	0700067M	RES.-CARBON FLM 1/16W 100K-JB
RR42	0700041M	RES.-CARBON FLM 1/16W 1.0K-JB
RR43	0700055M	RES.-CARBON FLM 1/16W 12K-JB
RR44	0700066M	RES.-CARBON FLM 1/16W 82K-JB
RR45	0700067M	RES.-CARBON FLM 1/16W 100K-JB
RR46	0700041M	RES.-CARBON FLM 1/16W 1.0K-JB

REPLACEMENT PARTS LIST

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SYMBOL NO.	PART NO.	PART DESCRIPTION
RR47	0700046M	RES.-CARBON FLM 1/16W 2.7K-JB
RR48	0700041M	RES.-CARBON FLM 1/16W 1.0K-JB
RR49	0700041M	RES.-CARBON FLM 1/16W 1.0K-JB
RR50	0700041M	RES.-CARBON FLM 1/16W 1.0K-JB
RR51	0700041M	RES.-CARBON FLM 1/16W 1.0K-JB
RR52	0700027M	RES.-CARBON FLM 1/16W 100-JB
RR53	0700027M	RES.-CARBON FLM 1/16W 100-JB
RR54	0700027M	RES.-CARBON FLM 1/16W 100-JB
RR56	0700054M	RES.-CARBON FLM 1/16W 10K-JB
RR57	0700054M	RES.-CARBON FLM 1/16W 10K-JB
RR58	0700047M	RES.-CARBON FLM 1/16W 3.3K-JB
RR59	0700054M	RES.-CARBON FLM 1/16W 10K-JB
RR60	0700054M	RES.-CARBON FLM 1/16W 10K-JB
RR61	0700054M	RES.-CARBON FLM 1/16W 10K-JB
RR62	0700054M	RES.-CARBON FLM 1/16W 10K-JB
RR64	0700032M	RES.-CARBON FLM 1/16W 220-JB
RR65	0700054M	RES.-CARBON FLM 1/16W 10K-JB
RR66	0700036M	RES.-CARBON FLM 1/16W 470-JB
RR70	0700036M	RES.-CARBON FLM 1/16W 470-JB
RR71	0700047M	RES.-CARBON FLM 1/16W 3.3K-JB
RR72	0700027M	RES.-CARBON FLM 1/16W 100-JB
RR73	0700045M	RES.-CARBON FLM 1/16W 2.2K-JB
RR74	0700043M	RES.-CARBON FLM 1/16W 1.5K-JB
RR75	0700027M	RES.-CARBON FLM 1/16W 100-JB
RR78	0100041M	RES.-CARBON FLM 1/8W 100-JB
RR79	0100065M	RES.-CARBON FLM 1/8W 1K-JB
RR80	0100041M	RES.-CARBON FLM 1/8W 100-JB
RS01	0700046M	RES.-CARBON FLM 1/16W 2.7K-JB
RSA1	0114131M	RES.-CARBON FLM 1/4W 100-JB
RSA2	0700063M	RES.-CARBON FLM 1/16W 47K-JB
RSA3	0700063M	RES.-CARBON FLM 1/16W 47K-JB
RSA4	0700045M	RES.-CARBON FLM 1/16W 2.2K-JB
RSA5	0700046M	RES.-CARBON FLM 1/16W 2.7K-JB
RSA6	0700027M	RES.-CARBON FLM 1/16W 100-JB
RSA7	0700027M	RES.-CARBON FLM 1/16W 100-JB
⚠ RSE1	0119505S	RES.-MTL FLM 1/4W 2.2-J
RSE3	0700054M	RES.-CARBON FLM 1/16W 10K-JB
RT01	0100113M	RES.-CARBON FLM 1/8W 100K-JB
RT02	0100065M	RES.-CARBON FLM 1/8W 1K-JB
RT03	0100113M	RES.-CARBON FLM 1/8W 100K-JB
RT04	0100065M	RES.-CARBON FLM 1/8W 1K-JB
RT17	0700034M	RES.-CARBON FLM 1/16W 330-JB
RT18	0700034M	RES.-CARBON FLM 1/16W 330-JB
RT19	0700034M	RES.-CARBON FLM 1/16W 330-JB
RT20	0700041M	RES.-CARBON FLM 1/16W 1.0K-JB
RT21	0700041M	RES.-CARBON FLM 1/16W 1.0K-JB
RT22	0700041M	RES.-CARBON FLM 1/16W 1.0K-JB
RT23	0700028M	RES.-CARBON FLM 1/16W 120-JB
RT24	0700028M	RES.-CARBON FLM 1/16W 120-JB
RT25	0700028M	RES.-CARBON FLM 1/16W 120-JB
RT26	0700032M	RES.-CARBON FLM 1/16W 220-JB
RT27	0700032M	RES.-CARBON FLM 1/16W 220-JB
RT28	0700032M	RES.-CARBON FLM 1/16W 220-JB
RT29	0700041M	RES.-CARBON FLM 1/16W 1.0K-JB
RT30	0700041M	RES.-CARBON FLM 1/16W 1.0K-JB
RT31	0700041M	RES.-CARBON FLM 1/16W 1.0K-JB
RT41	0100041M	RES.-CARBON FLM 1/8W 100-JB
RT42	0100041M	RES.-CARBON FLM 1/8W 100-JB
RT43	0100041M	RES.-CARBON FLM 1/8W 100-JB
RT44	0100041M	RES.-CARBON FLM 1/8W 100-JB
RT45	0100041M	RES.-CARBON FLM 1/8W 100-JB
RT46	0100041M	RES.-CARBON FLM 1/8W 100-JB
RT49	0100038M	RES.-CARBON FLM 1/8W 75-JB
RT50	0100038M	RES.-CARBON FLM 1/8W 75-JB
RT51	0100038M	RES.-CARBON FLM 1/8W 75-JB
RT52	0100061M	RES.-CARBON FLM 1/8W 680-JB
RT53	0100055M	RES.-CARBON FLM 1/8W 390-JB
RT54	0100061M	RES.-CARBON FLM 1/8W 680-JB
RT55	0100055M	RES.-CARBON FLM 1/8W 390-JB
RVC1	0700045M	RES.-CARBON FLM 1/16W 2.2K-JB
RVC2	0700065M	RES.-CARBON FLM 1/16W 68K-JB
RVC3	0700047M	RES.-CARBON FLM 1/16W 3.3K-JB
RVC4	0700033M	RES.-CARBON FLM 1/16W 270-JB
RVC5	0110223S	RES.-MTL OXIDE FLM 120-JS
RVC6	0110225S	RES.MTL OXIDE FLM 150-JS 2W
RVC7	0113764M	RES. CARBON FILM SRD1/2P-B 3.9K-J
RW01	0700067M	RES.-CARBON FLM 1/16W 100K-JB
RW02	0700059M	RES.-CARBON FLM 1/16W 27K-JB
RW06	0700034M	RES.-CARBON FLM 1/16W 330-JB
RW07	0700057M	RES.-CARBON FLM 1/16W 18K-JB
RW08	0700067M	RES.-CARBON FLM 1/16W 100K-JB
RW09	0700033M	RES.-CARBON FLM 1/16W 270-JB
RW10	0700033M	RES.-CARBON FLM 1/16W 270-JB
RW11	0700042M	RES.-CARBON FLM 1/16W 1.2K-JB
RW12	0700045M	RES.-CARBON FLM 1/16W 2.2K-JB
RW13	0700058M	RES.-CARBON FLM 1/16W 22K-JB
RW16	0113742M	RES.-CARBON FLM 1/2W 470-JB
RW17	0700046M	RES.-CARBON FLM 1/16W 2.7K-JB
RW19	0700043M	RES.-CARBON FLM 1/16W 1.5K-JB
RW21	0113701M	RES. CARBON FILM SRD1/2P-B 10-J
RW22	0100039M	RES.-CARBON FLM 1/8W 82-JB
RW23	0100039M	RES.-CARBON FLM 1/8W 82-JB
RW24	0114165M	RES.-CARBON FILM SRD 1/4 PF 1.5K-J
RW25	0100069M	RES.-CARBON FLM 1/8W 1.5K-JB
RW26	0114143M	RES.-CARBON FLM 1/4W 330-JB
RW27	0114221M	RES.-CARBON FLM 1/4 PB 68K-J
RW28	0114221M	RES.-CARBON FLM 1/4 PB 68K-J
RW29	0100053M	RES.-CARBON FLM 1/8W 330-JB
RW30	0113776M	RES. CARBON FILM SRD1/2P-B 12K-J
RW31	0113716M	RES. CARBON FILM SRD1/2P-B 43-J
RW32	0113716M	RES. CARBON FILM SRD1/2P-B 43-J
RW33	0113686M	RES.-CARBON FLM 1/2W 2.7-J
RW34	0113686M	RES.-CARBON FLM 1/2W 2.7-J
RW35	0110229S	RES.-MTL OXIDE FLM 220-JS
RW36	0110139S	RES.-MTL OXIDE FLM 1W 560-JS
RW37	0110232S	RES.-MTL OXIDE FLM 300-JS
RW38	0700049M	RES.-CARBON FLM 1/16W 4.7K-JB
RW39	0700051M	RES.-CARBON FLM 1/16W 5.6K-JB
RW40	0700061M	RES.-CARBON FLM 1/16W 33K-JB
RW41	0700036M	RES.-CARBON FLM 1/16W 470-JB
RW42	0700067M	RES.-CARBON FLM 1/16W 100K-JB
RW43	0700056M	RES.-CARBON FLM 1/16W 15K-JB
RW44	0700043M	RES.-CARBON FLM 1/16W 1.5K-JB
RW45	0700067M	RES.-CARBON FLM 1/16W 100K-JB
RW47	0700041M	RES.-CARBON FLM 1/16W 1.0K-JB
RW48	0700041M	RES.-CARBON FLM 1/16W 1.0K-JB
RW49	0700046M	RES.-CARBON FLM 1/16W 2.7K-JB
RW51	0700033M	RES.-CARBON FLM 1/16W 270-JB
RW52	0700035M	RES.-CARBON FLM 1/16W 390-JB
RW53	0700035M	RES.-CARBON FLM 1/16W 390-JB

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SYMBOL NO.	PART NO.	PART DESCRIPTION
RW54	0700041M	RES.-CARBON FLM 1/16W 1.0K-JB
RW55	0700028M	RES.-CARBON FLM 1/16W 120-JB
RYG1	0700058M	RES.-CARBON FLM 1/16W 22K-JB
RYG2	0700041M	RES.-CARBON FLM 1/16W 1.0K-JB
RYG7	0700054M	RES.-CARBON FLM 1/16W 10K-JB
RYG8	0700041M	RES.-CARBON FLM 1/16W 1.0K-JB
RYG9	0700041M	RES.-CARBON FLM 1/16W 1.0K-JB
RYH2	0700041M	RES.-CARBON FLM 1/16W 1.0K-JB
RYH3	0700058M	RES.-CARBON FLM 1/16W 22K-JB
RYH4	0700054M	RES.-CARBON FLM 1/16W 10K-JB
RYH5	0700058M	RES.-CARBON FLM 1/16W 22K-JB
RYH6	0700054M	RES.-CARBON FLM 1/16W 10K-JB
RYH7	0700054M	RES.-CARBON FLM 1/16W 10K-JB
RYH8	0700045M	RES.-CARBON FLM 1/16W 2.2K-JB
RYH9	0700045M	RES.-CARBON FLM 1/16W 2.2K-JB
RYJ1	0700049M	RES.-CARBON FLM 1/16W 4.7K-JB
RYJ2	0700049M	RES.-CARBON FLM 1/16W 4.7K-JB
RYJ3	0700067M	RES.-CARBON FLM 1/16W 100K-JB
		SWITCHES
S001	2632851	5KEY TACT SWITCH
S002	2634621	SWITCH BLOCK VR
S003	2634621	SWITCH BLOCK VR
⚠ S701	FJ00071	AC POWER RELAY ALK3213
⚠ S702	FJ00071	AC POWER RELAY ALK3213
⚠ S703	FJ00071	AC POWER RELAY ALK3213
⚠ S901	FJ00071	AC POWER RELAY ALK3213
		TRANSFORMERS
T201	2143672	IF COIL WITH 7 CASE 1:3 INCORE
⚠ T701	2260261	DRIVE TRANSFORMER
⚠ T702	2437122	HFL1530G-RC
⚠ T771	2272762	TRANS.-SATURBLE
⚠ T901	BT00742	SW TRANS.(PA1)
		CRT
V1	2471561	CRT A68KSA30X (DARK TINT)
		CRYSTALS
X001	BP00801	OSCILLATOR 8.00MHZ
X201	2300477	SAW FILTER HW2267
X241	2167311	FILTER CERAMIC (4.5MHZ)
X242	2167201	TRAP CERAMIC (4.5MHZ)
X243	BN00031	CERAMIC DISCRIMINATOR
X301	HP00151	COMB FILTER UNIT TYPE MN138H
X501	2791505	CRYSTAL HC-491U 3.58MHZ
X751	2168771	X'TAL CSB503F30
⚠ X901	AJ00332	ENC221D-14A
XT11	BJ00392R	LC FILTER 220L7R0SST-ELKAW470GB
XT12	BJ00392R	LC FILTER 220L7R0SST-ELKAW470GB
XT13	BJ00392R	LC FILTER 220L7R0SST-ELKAW470GB
XW01	2150361	FILTER SDL4620
XY03	2163974	VFL-CSA 8.00M
		MISCELLANEOUS PARTS
#21	3701202	PWB HOLDER G7-A PA
#100	QD00734	FRAME SUBASSEMBLY 27MM20B
#106	NT01041	TERMINAL BOARD PA-1
#125	PC00343	BUTTON 27CX3B
#130	8781642	SCREW 4*12 TAPPING
#135	H310881	R/C LENS 27CX3B
#140	8781642	SCREW 4*12 TAPPING
#145	3487425	HITACHI BADGE 35UX80B
⚠ #160	3739671	BS CORD HOLDER NYLON6
#200	4528351	M6X30 TAP SCREW WITH WASHER
#203	4519503	3X12 B TAPPING SCREW SWCH15A
#205	4286582	PVC WASHER T1.5
#210	4159427	3X10 SCREW WITH WASHER STEEL
#215	4519512	4X16 B TAPPING SCREW
#220	4520771	HEXAGON HEAD TAPPING SCREW 4*1
#251	4520232	4X16 D TAPPING SCREW SWCH16A
#300	3163508	COVER 27CX3B
#305	4519512	4X16 B TAPPING SCREW
#310	4519512	4X16 B TAPPING SCREW
#315	3727972	POWER CORD HANGER
#900	8440444	SP HIMERON C29-BV20
#906	PH04801	TERMINAL LABEL PA-1
E203	2784243	DRY BATTERY SUM-3 (G)
E301	HL00723	RML-CLU-433PC
⚠ E601	BY00491	DY 27V
E602	2908401	CRT EARTH WIRE
E603	2771461	EDGE MAGNET
E604	2775082	MAGNET VM
⚠ E77A	2974562	CONNECTOR 06C-A5R0-681
E802	2976671	CONN. W/WIRE SEH 4J (L560)
E851	EY00302	CPT-SOCKET(S)
E87A	2974134S	CONNE.EH 5P B-C L=750
E901	2972841	AC POWER CORD (FILTER IN)
E902	EF02493	CONNECTOR 01A-A0R0-561BROWN
E903	EF02494	CONNECTOR 01A-A0R0-561RED
ECPT	2668151	2J MINI-CONNECTOR
EF901	2720641	FUSE HOLDER
EF902	2720641	FUSE HOLDER
EP51	2956485	CONNECTOR CO-01C-A--471
⚠ EP70	AZ00103M	PROTECTOR
EVM1	2974098S	CONN.W/WIRE 4J SEH L470 (C-B)
EX1	2973888S	EH CONNE.9P L=470
EX2A	2976661	CONN. W/WIRE SEH 12J (L300)
EX3	2973918S	EH CONNE.10P L=470
J301	ES00142	JACK 7P
JMS	EY00581	SOCKET
JP51	9371901	SC ANNEALED COPPER WIRE 0.65
JPC	2902981	15P D-SUB CONNE.
JS1	2693851	TERMINAL JXT1043
JSL	2976647	2J EH CONNECTOR 701
JSR	2976656	3J EH CONNECTOR
K271	9374575	UL CSA1007-24HP CODE GREEN
K272	9374575	UL CSA1007-24HP CODE GREEN
K775	9374722	WIRE UL1015 7/0.26 SN ORANGE
K776	9374526	WIRE UL1015 7/0.26 SN YELLOW
K801	9374575	UL CSA1007-24HP CODE GREEN
K802	9374575	UL CSA1007-24HP CODE GREEN
K803	9374722	WIRE UL1015 7/0.26 SN ORANGE
K804	9374575	UL CSA1007-24HP CODE GREEN
K856	9371901	SC ANNEALED COPPER WIRE 0.65
K998	9374575	UL CSA1007-24HP CODE GREEN
K999	9374723	WIRE UL1015 7/0.26 SN BLACK
KC103	9374575	UL CSA1007-24HP CODE GREEN
KIF1	9371901	SC ANNEALED COPPER WIRE 0.65
KIF2	9374574	SC WIRE UL1007 CSATR64 AWG24 YELLO
KIP4	9374575	UL CSA1007-24HP CODE GREEN
KIP5	9374575	UL CSA1007-24HP CODE GREEN
KIP6	9374575	UL CSA1007-24HP CODE GREEN
KIP7	9374575	UL CSA1007-24HP CODE GREEN
KIP8	9374575	UL CSA1007-24HP CODE GREEN

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SYMBOL NO.	PART NO.	PART DESCRIPTION
KL103	9371803	NETTED WIRE 4*16/0.12
KQ584	9374575	UL CSA1007-24HP CODE GREEN
KS01	9374574	SOLDER COATED WIRE UL1007 CSATR64 AW
KS02	9374574	SOLDER COATED WIRE UL1007 CSATR64 AW
KS03	9374574	SOLDER COATED WIRE UL1007 CSATR64 AW
KS04	9374574	SOLDER COATED WIRE UL1007 CSATR64 AW
KS05	9374575	UL CSA1007-24HP CODE GREEN
KS06	9374575	UL CSA1007-24HP CODE GREEN
KT01	9374575	UL CSA1007-24HP CODE GREEN
KT03	9374575	UL CSA1007-24HP CODE GREEN
KT04	9374575	UL CSA1007-24HP CODE GREEN
KT05	9374575	UL CSA1007-24HP CODE GREEN
N101	0000000	UNFIXED PART
N101	3785511	V LOCK 16
N102	3785522	V LOCK 20
N103	3785502	V LOCK 11.5
N104	3785522	V LOCK 20
N105	3705232	ANODE CLAMPER
N106	3785511	V LOCK 16
N107	3785522	V LOCK 20
N108	3785511	V LOCK 16
N109	3785522	V LOCK 20
N110	3785502	V LOCK 11.5
N111	3785502	V LOCK 11.5
N112A	9374506	WIRE UL1007 CSATR64 AWG22 1/0.
N113	3763751	SK BINDER
N114	3785502	V LOCK 11.5
N115	3737102	PURSE LOCK 15
N116	3785502	V LOCK 11.5
N130	3700342	WIRE CLAMP V0
N202	H311361	LABEL-MOUSE OPERATION
N444	3772201	AC CORD HOLDER NYLON
N601	4615641	WEDGE
N605	0649009	HOOK-30
N606	3330941	EARTH SPRING
N607B	3763751	SK BINDER
N608	3763751	SK BINDER
N610	2772981	FERRITE SHEET ASS'Y
N611	2772211	MAG. PIECE
N700	H461171	PATENT AND TELESONICS LABEL
N801	MD03371	CPT SHIELD 27MM20B
N888	3763751	SK BINDER
N910	4107502	PWB METAL R (A1) TC-30
N912	4107512	A1LXU1 PWB METAL L TC-30
ND712	MA00951	HEAT SINK PA-1
ND712A	4520883	3*12 SCREW WITH WASHER
ND714	3446472	HEATSINK
ND714A	4520883	3*12 SCREW WITH WASHER
ND934	3446472	HEATSINK
ND934A	4520883	3*12 SCREW WITH WASHER
ND936	3446472	HEATSINK
ND936A	4520883	3*12 SCREW WITH WASHER
NE901	3772201	AC CORD HOLDER NYLON
NI403	3446862	VERTICAL HEAT SINK M1LXU
NI403A	4520881	M3*8 SCREW WITH WASHER
NI403B	8821234	NUT-3
NI601	3446864	V.HEAT SINK M3LXU
NI601A	4520881	M3*8 SCREW WITH WASHER
NI601B	8821234	NUT-3
NI901	4289236	G7NSU2 POWER HEAT SINK
NI901A	4520883	3*12 SCREW WITH WASHER
NI901B	8821114	NUT,3
NJPCA	4527661	M2.6 INCH SCREW
NMV1	4159423	SCR NO 3X12 FL/FLT
NMV4	4243445	G51 INSULATION WASHER PL
NN01	MD03361	SHIELD CASE PA-1
NN02	MD03351	SHIELD PLATE PA-1
NQ701	3445563	HEAT SINK A3LXU
NQ701A	4520881	M3*8 SCREW WITH WASHER
NQ702	3442026	METAL PARTS FOR HOUT(HEAT SINK)
NQ702A	4514061	SCREW FLANGED 3*12
NQ705	MA00891	VERTICAL HEAT SINK
NQ705A	4520881	M3*8 SCREW WITH WASHER
NQ707	4334013	HEAT SINK
NQ707A	4520881	M3*8 SCREW WITH WASHER
NQ72H	4334013	HEAT SINK
NQ72HA	4520881	M3*8 SCREW WITH WASHER
NQ754	4340673	D ID1 HEAT SINK
NQ754A	4520883	3*12 SCREW WITH WASHER
NQ754B	9414017	SILICONE COMPOUND(G-746)
NQ756	MA00891	VERTICAL HEAT SINK
NQ756A	4520881	M3*8 SCREW WITH WASHER
NQ774	4276993	VERTICAL HEAT SINK
NQ774A	4520883	3*12 SCREW WITH WASHER
NQ775	4340673	D ID1 HEAT SINK
NQ851	4340673	D ID1 HEAT SINK
NQ851A	4520883	3*12 SCREW WITH WASHER
NQ851B	9414017	SILICONE COMPOUND(G-746)
NQ854	4340673	D ID1 HEAT SINK
NQ854A	4520883	3*12 SCREW WITH WASHER
NQ854B	9414017	SILICONE COMPOUND(G-746)
NQ857	4340673	D ID1 HEAT SINK
NQ857A	4520883	3*12 SCREW WITH WASHER
NQ857B	9414017	SILICONE COMPOUND(G-746)
NT702	8821114	NUT,3
NT702A	4243445	G51 INSULATION WASHER PL-11T
NT702B	8711412	SCREW-3X12 PAN HEAD
NWQ1	3446473	HEATSINK H30 P10
NWQ2	4520883	3*12 SCREW WITH WASHER
NX901	2784342	CONDENSER COVER
P31	2661751	2P PLUG PIN WITH BASE
P67A	ED00568	CP-TAC-L12X-A1
P67B	ED00508	CP-TAC-L12P-A1
P77B	2661755	6P PLUG PIN WITH BASE
P801	2902263	PLUG PIN SUB MINI 4P
P87B	2902264	PLUG PIN SUB MINI 5P
P901	2782611	CENTER PIN
P902	2782611	CENTER PIN
PAGC	2123461M	FERRITE BEADS B 0.8 MH
PCPT	2661751	2P PLUG PIN WITH BASE
PFIL	2661756	1P PLUG PIN WITH BASE
PIF1A	ED00576	CP-TAC-L20X-A1
PIF1B	ED00516	CP-TAC-L20P-A1
PIF2A	ED00572	CP-TAC-L15X-A1
PIF2B	ED00512	CP-TAC-L15P-A1
PIF3A	ED00572	CP-TAC-L15X-A1
PIF3B	ED00512	CP-TAC-L15P-A1
PJIG	2661753	4P PLUG PIN WITH BASE
PMH	2661754	5P PLUG PIN WITH BASE
PMV	2661752	3P PLUG PIN WITH BASE

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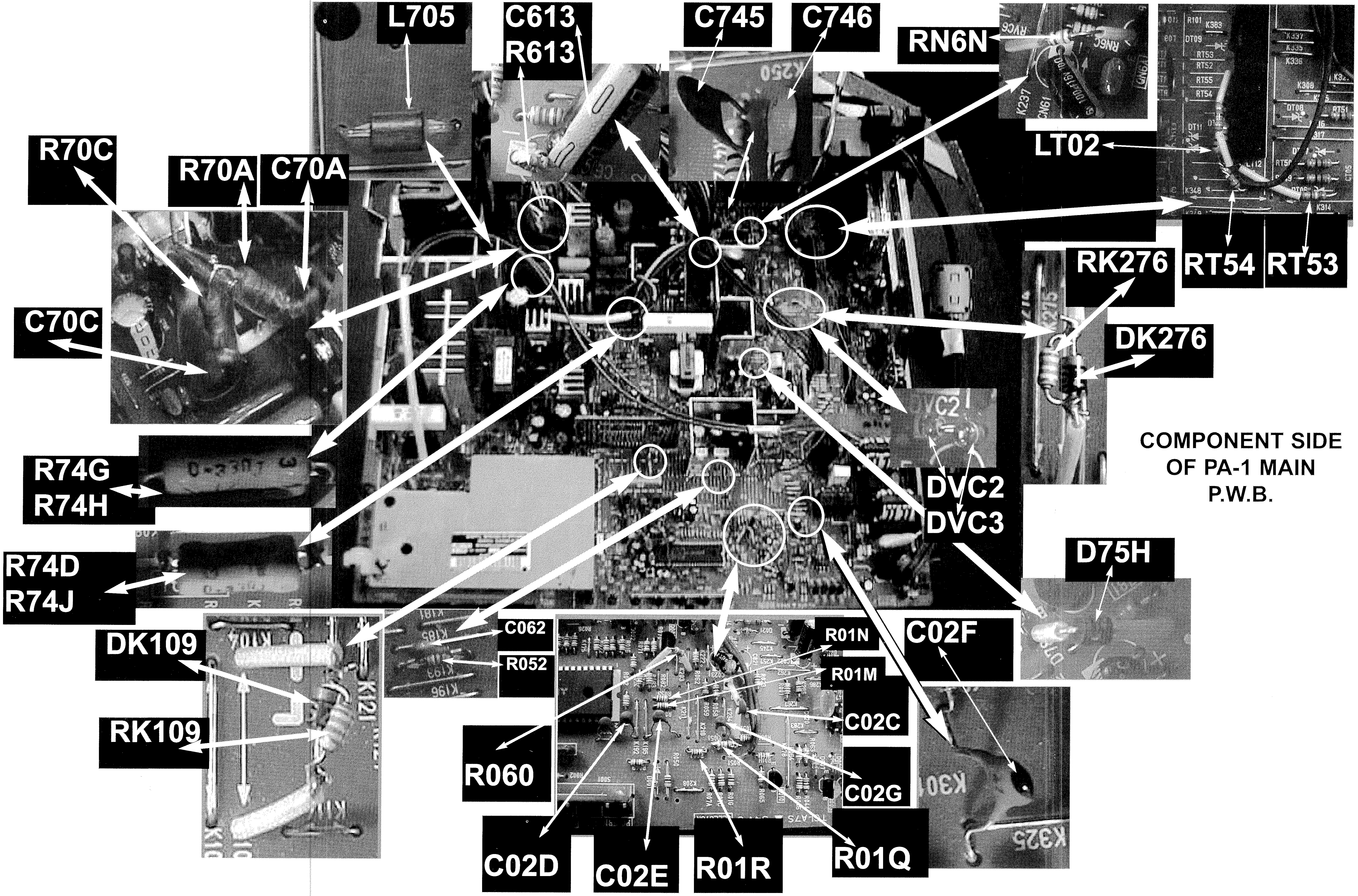
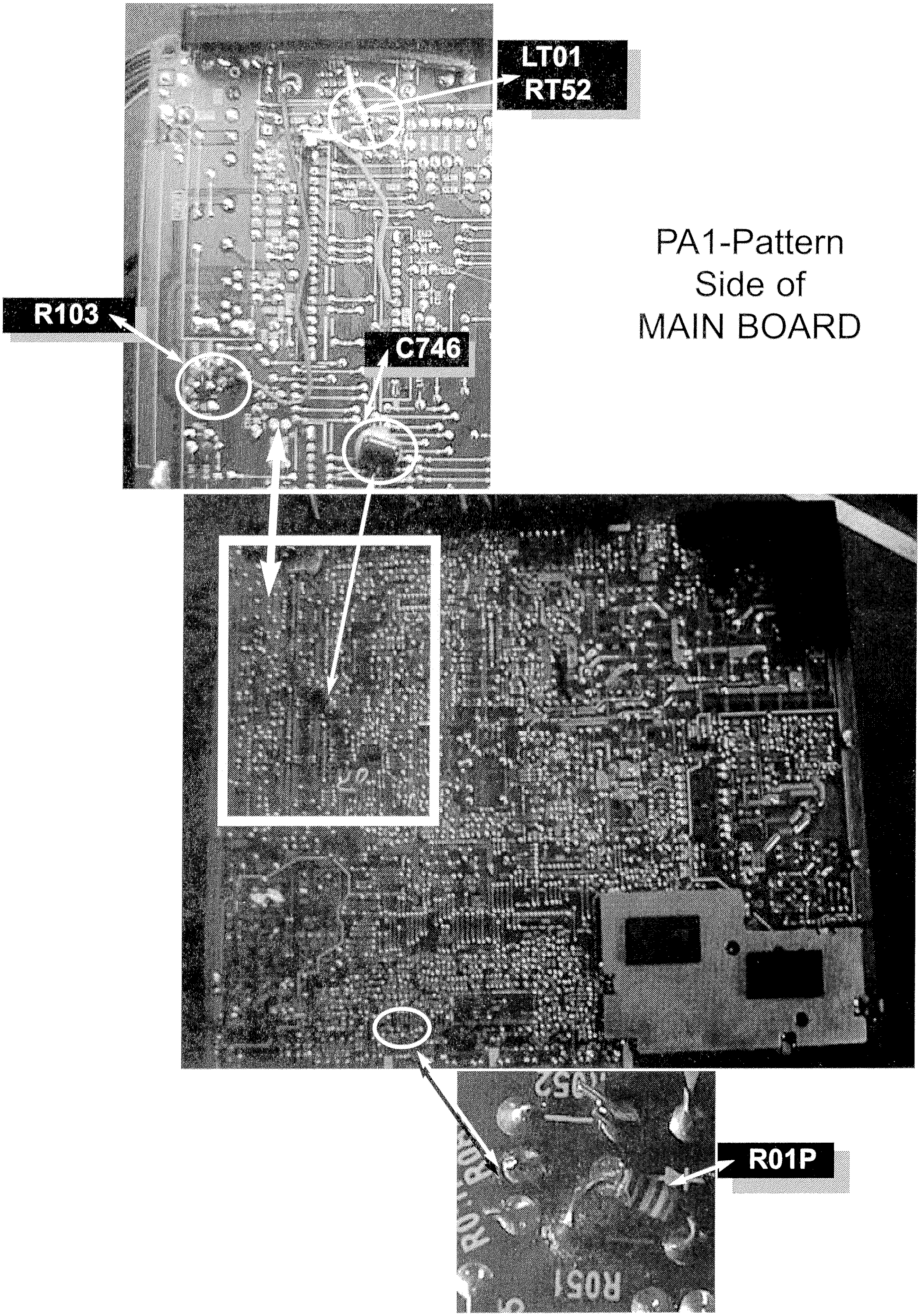
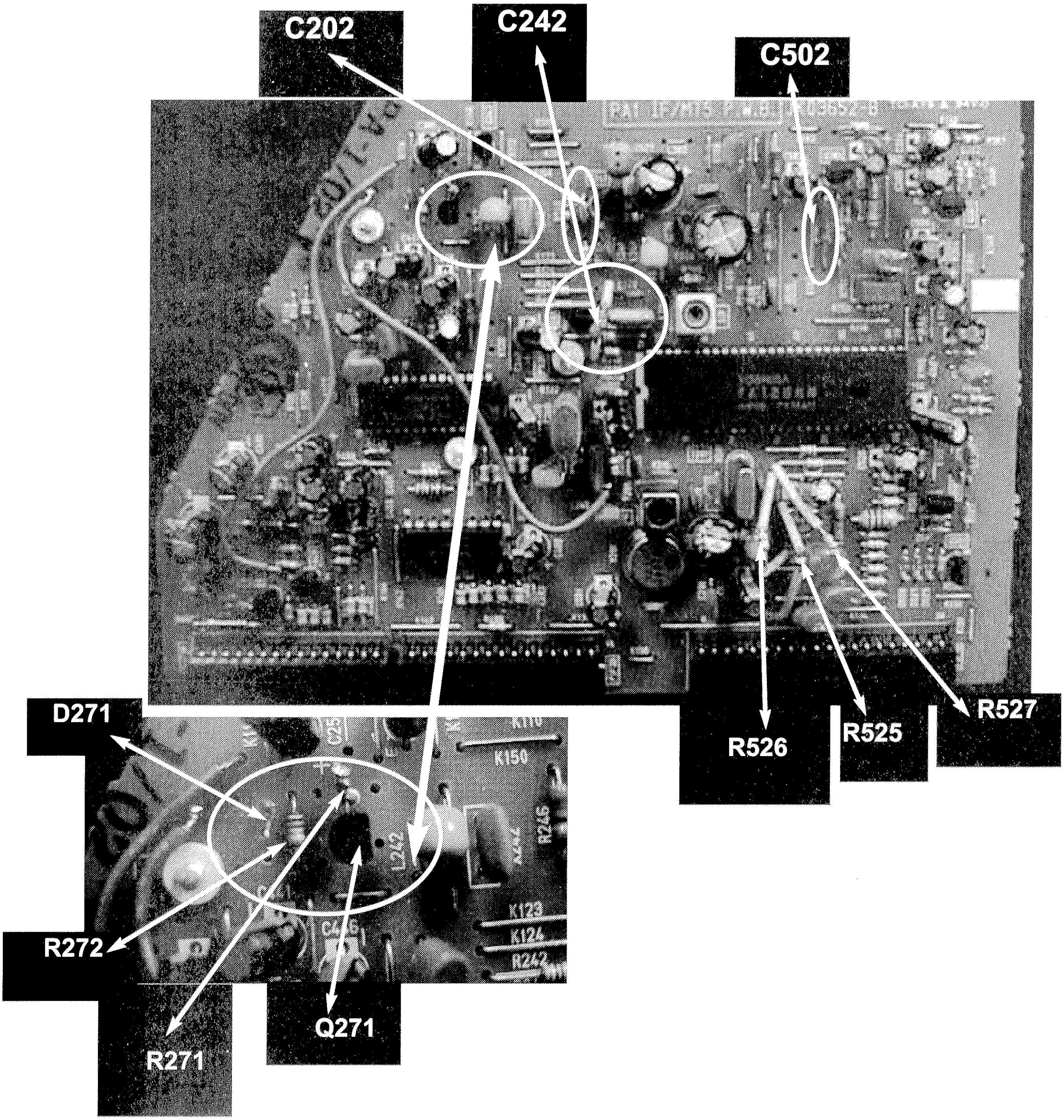
SYMBOL NO.	PART NO.	PART DESCRIPTION
PPCM	ED00564	CP-TAC-L08X-A1
PPCMB	ED00504	CP-TAC-L08P-A1
PS1A	ED00572	CP-TAC-L15X-A1
PS1B	ED00512	CP-TAC-L15P-A1
PS2A	ED00569	CP-TAC-L13X-A1
PS2B	ED00509	CP-TAC-L13P-A1
PSIF	2661756	1P PLUG PIN WITH BASE
PSL	2902261	PLUGPIN SUB MINI 2P
PSR	2902262	PLUG PIN SUB MINI 3P
PVC0	2661756	1P PLUG PIN WITH BASE
PVM1	2902263	PLUG PIN SUB MINI 4P
PVM2	2661756	1P PLUG PIN WITH BASE
PW	2661753	4P PLUG PIN WITH BASE
PX1A	2902268	PLUG PIN SUB MINI 9P
PX1B	2902268	PLUG PIN SUB MINI 9P
PX2B	2902272	PLUG PIN SUB MINI 12P
PX3A	2902269	PLUG PIN SUB MINI10P
PX3B	2902269	PLUG PIN SUB MINI10P
SP451	GK00062	SP-05X09D
SP452	GK00062	SP-05X09D
U001	CZ00641	GP1U281Q
⚠ U101	HJ00081	ET452A
Z024	9451104	VARNISH CLOTH TUBE 0.8X1.8 YELLOW
Z202	EW03101	CORD 6P MINI DIN CABLE
Z203	EW00221	CORD HDB15-HDB15(DDC)2
Z403	9414017	SILICONE COMPOUND(G-746)
Z510	9449603	NITTOH TAPE #747
Z601	9414017	SILICONE COMPOUND(G-746)
Z702	9414017	SILICONE COMPOUND(G-746)
Z705	9414017	SILICONE COMPOUND(G-746)
Z707	9414017	SILICONE COMPOUND(G-746)
Z70A	9451119	UL-TUBE NO.9/16 INCH CLEAR
Z712	9414017	SILICONE COMPOUND(G-746)
Z714	9413926	SILICON RUBBER
Z722	9413926	SILICON RUBBER
Z755	9449553	TAPE-ADHESIVE W19 NITTO#223S(B PVC
Z756	9414017	SILICONE COMPOUND(G-746)
Z775	9449503	ADHESIVE TAPE (SCOTCH NO.3 W=9)
Z901	9414017	SILICONE COMPOUND(G-746)
⚠ Z902	2169512	CLAMP NOISE FILTER ZCAT3035
Z903	9414017	SILICONE COMPOUND(G-746)
Z905	9449503	ADHESIVE TAPE (SCOTCH NO.3 W=9)
Z936	9414017	SILICONE COMPOUND(G-746)
ZC016	9413926	SILICON RUBBER
ZC017	9413926	SILICON RUBBER
ZC02C	9451104	VARNISH CLOTH TUBE 0.8X1.8 YELLOW
ZC201	9451104	VARNISH CLOTH TUBE 0.8X1.8 YELLOW
ZC242	9451104	VARNISH CLOTH TUBE 0.8X1.8 YELLOW
ZC71H	9413926	SILICON RUBBER
ZC746	9414017	SILICONE COMPOUND(G-746)
ZCN7L	9451104	VARNISH CLOTH TUBE 0.8X1.8 YELLOW
ZCP01	9451104	VARNISH CLOTH TUBE 0.8X1.8 YELLOW
ZD75H	9451104	VARNISH CLOTH TUBE 0.8X1.8 YELLOW
ZDW1	9451136	UL CSA TUBE NO.8
ZJ801	9485158	HOT MELT (AX-1503C)
ZJSL2	9563445	EXCEED GLASS TUBE HG-2E 3.5
ZJSR2	9563445	EXCEED GLASS TUBE HG-2E 3.5
ZK109	9451104	VARNISH CLOTH TUBE 0.8X1.8 YELLOW
ZK276	9451104	VARNISH CLOTH TUBE 0.8X1.8 YELLOW
ZK803	9563445	EXCEED GLASS TUBE HG-2E 3.5
ZK804	9449602	ADHESIVE TAPE(NITTOH NO.747 W6)
ZK805	9449567	TAPE-ADHESIVE W9 NITTO#223S(B) PVC
ZKL103	9451120	UL-TUBE NO.5 CLEAR
ZKS01	9485158	HOT MELT (AX-1503C)
ZKS02	9485158	HOT MELT (AX-1503C)
ZKS03	9485158	HOT MELT (AX-1503C)
ZKS05	9413926	SILICON RUBBER
ZKS06	9413926	SILICON RUBBER
ZKT05	9485158	HOT MELT (AX-1503C)
ZQ584	9449603	NITTOH TAPE #747
ZQ851	2787213	INSULATOR FOR TRANSISTOR
ZQ854	2787213	INSULATOR FOR TRANSISTOR
ZQ857	2787213	INSULATOR FOR TRANSISTOR
ZR525	9451104	VARNISH CLOTH TUBE 0.8X1.8 YELLOW
ZR526	9451104	VARNISH CLOTH TUBE 0.8X1.8 YELLOW
ZR527	9451104	VARNISH CLOTH TUBE 0.8X1.8 YELLOW
ZR74G	9451104	VARNISH CLOTH TUBE 0.8X1.8 YELLOW
ZR74J	9451104	VARNISH CLOTH TUBE 0.8X1.8 YELLOW
ZRN6N	9451104	VARNISH CLOTH TUBE 0.8X1.8 YELLOW
ZRP02	9451104	VARNISH CLOTH TUBE 0.8X1.8 YELLOW
ZRP04	9451104	VARNISH CLOTH TUBE 0.8X1.8 YELLOW
ZRP06	9451104	VARNISH CLOTH TUBE 0.8X1.8 YELLOW
ZRP51	9451104	VARNISH CLOTH TUBE 0.8X1.8 YELLOW
ZRP52	9451104	VARNISH CLOTH TUBE 0.8X1.8 YELLOW
ZRP53	9451104	VARNISH CLOTH TUBE 0.8X1.8 YELLOW
ZRR41	9451104	VARNISH CLOTH TUBE 0.8X1.8 YELLOW
ZRT17	9451104	VARNISH CLOTH TUBE 0.8X1.8 YELLOW
ZRT52	9451120	UL-TUBE NO.5 CLEAR
ZRT53	9451104	VARNISH CLOTH TUBE 0.8X1.8 YELLOW
ZX901	9449567	TAPE-ADHESIVE W9 NITTO#223S(B) PVC
⚠ EK002	AZ00103M	PROTECTOR


L705
C613
R613
C745
C746
RN6N
LT02
R70C
R70A
C70A
C70C
R74G
R74H
R74D
R74J
RT54
RT53
RK276
DK276
DVC2
DVC3
D75H
C02F
DK109
RK109
C062
R052
R01N
R01M
C02C
C02G
R060
C02D
C02E
R01R
R01Q

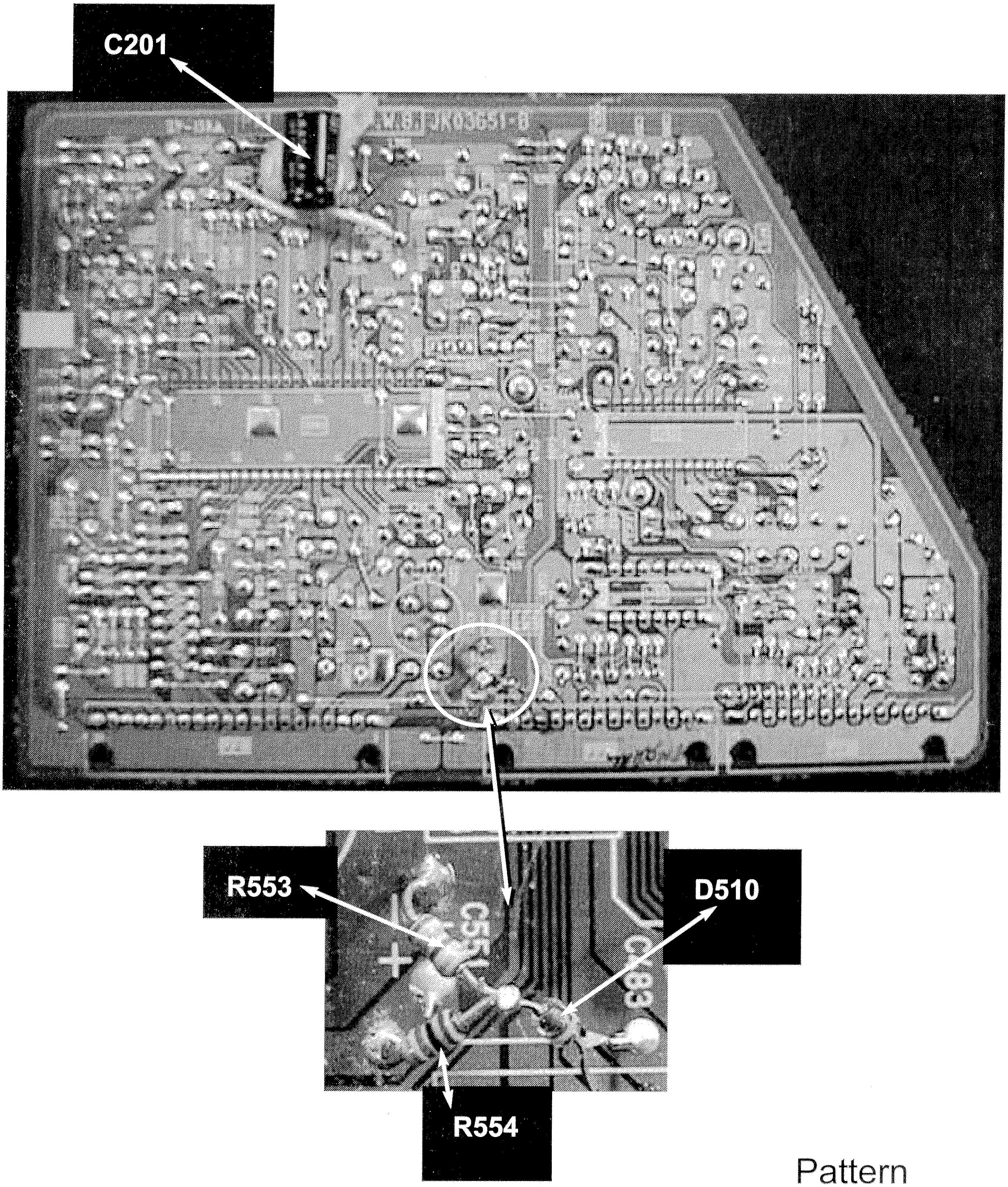
COMPONENT SIDE
OF PA-1 MAIN
P.W.B.

PA1-Pattern
Side of
MAIN BOARD

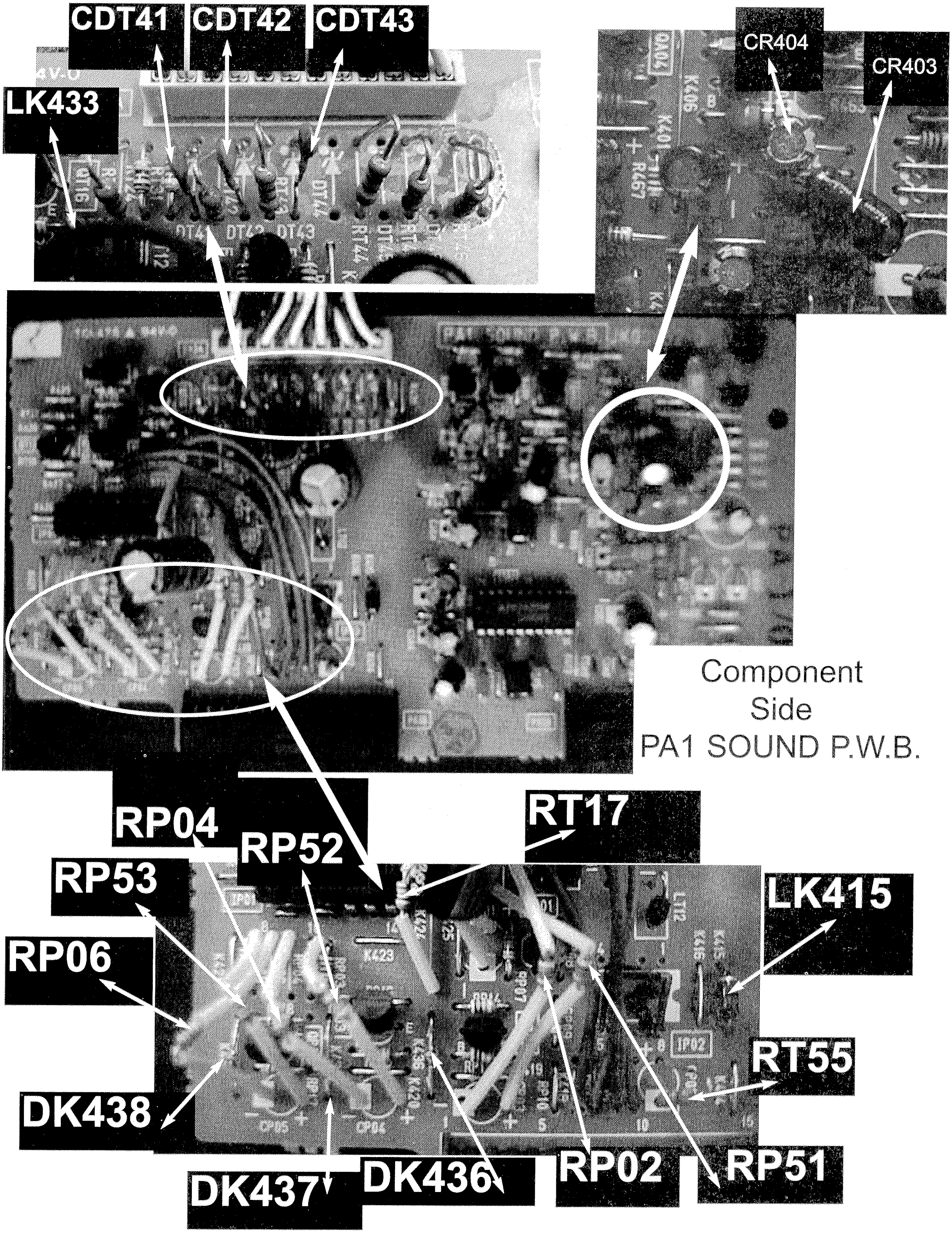

LT01
RT52
R103
C746
R01P
R051


C202
C242
C502
D271
R526
R525
R527
R272
R271
Q271

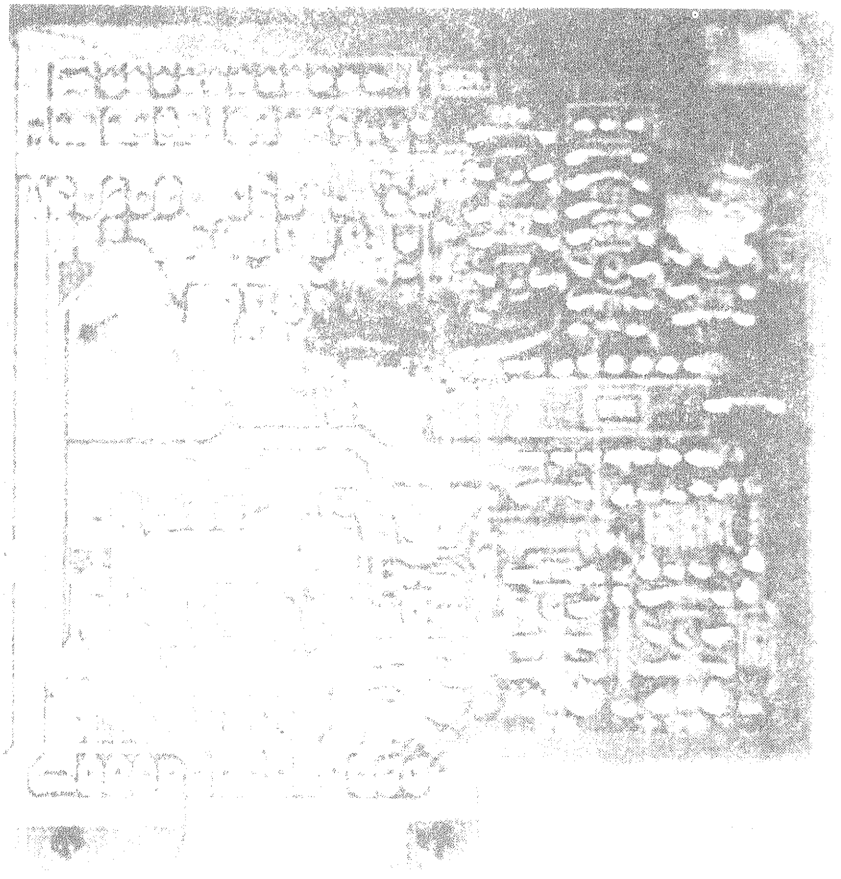
Component
Side
PA1 IF/MTS P.W.B.


C201
R553
D510
R554

Pattern
Side of
PA1 IF/MTS P.W.B.


CDT41
CDT42
CDT43
LK433
CR404
CR403
RP04
RP52
RT17
RP53
LK415
RP06
RT55
DK438
DK437
DK436
RP02
RP51

Component
Side
PA1 SOUND P.W.B.



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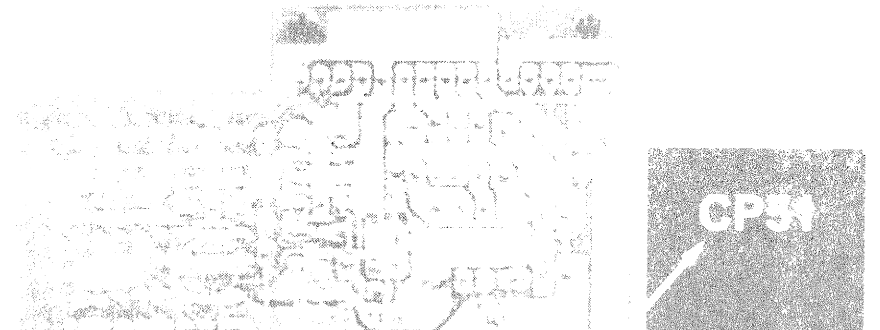
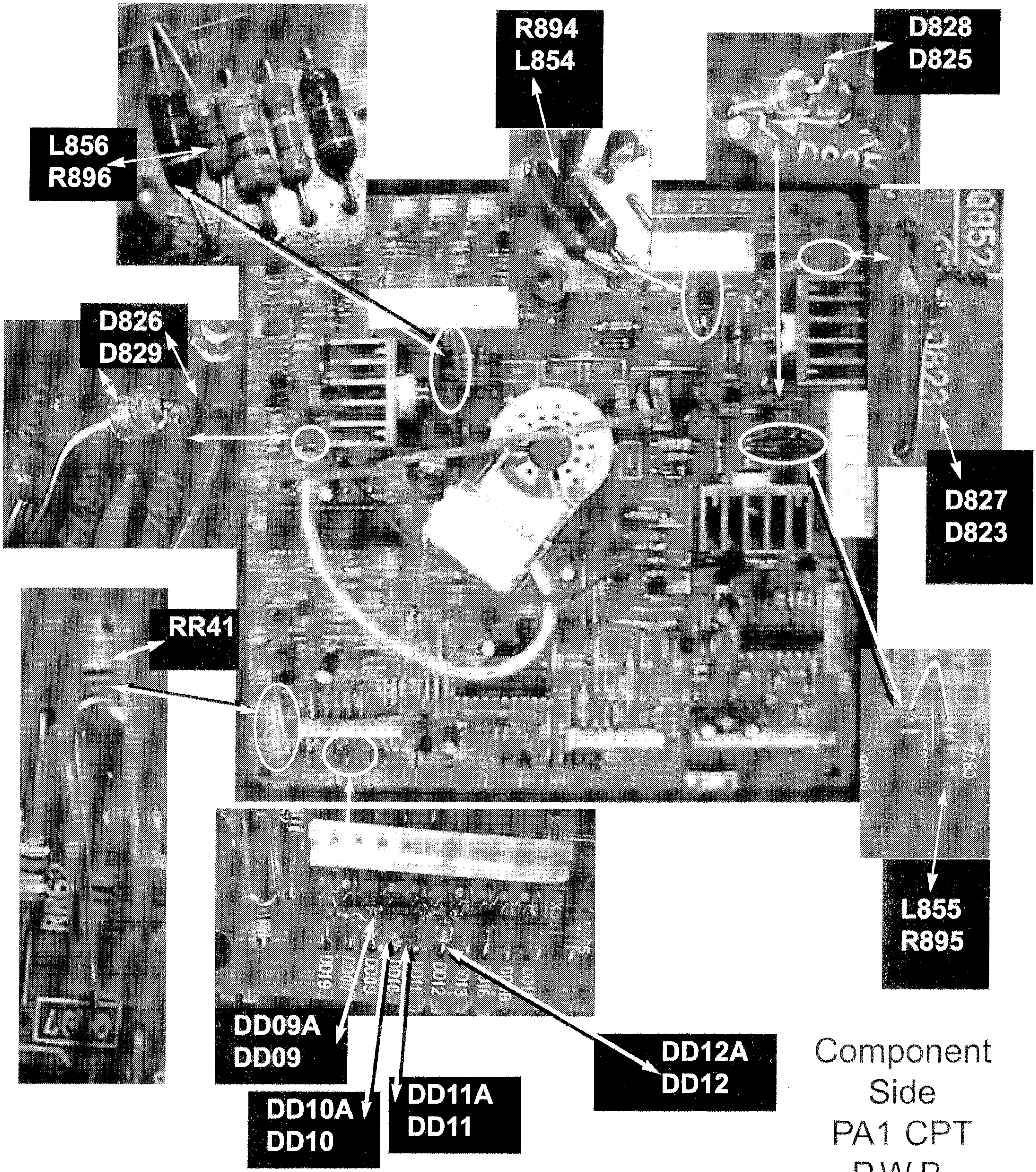
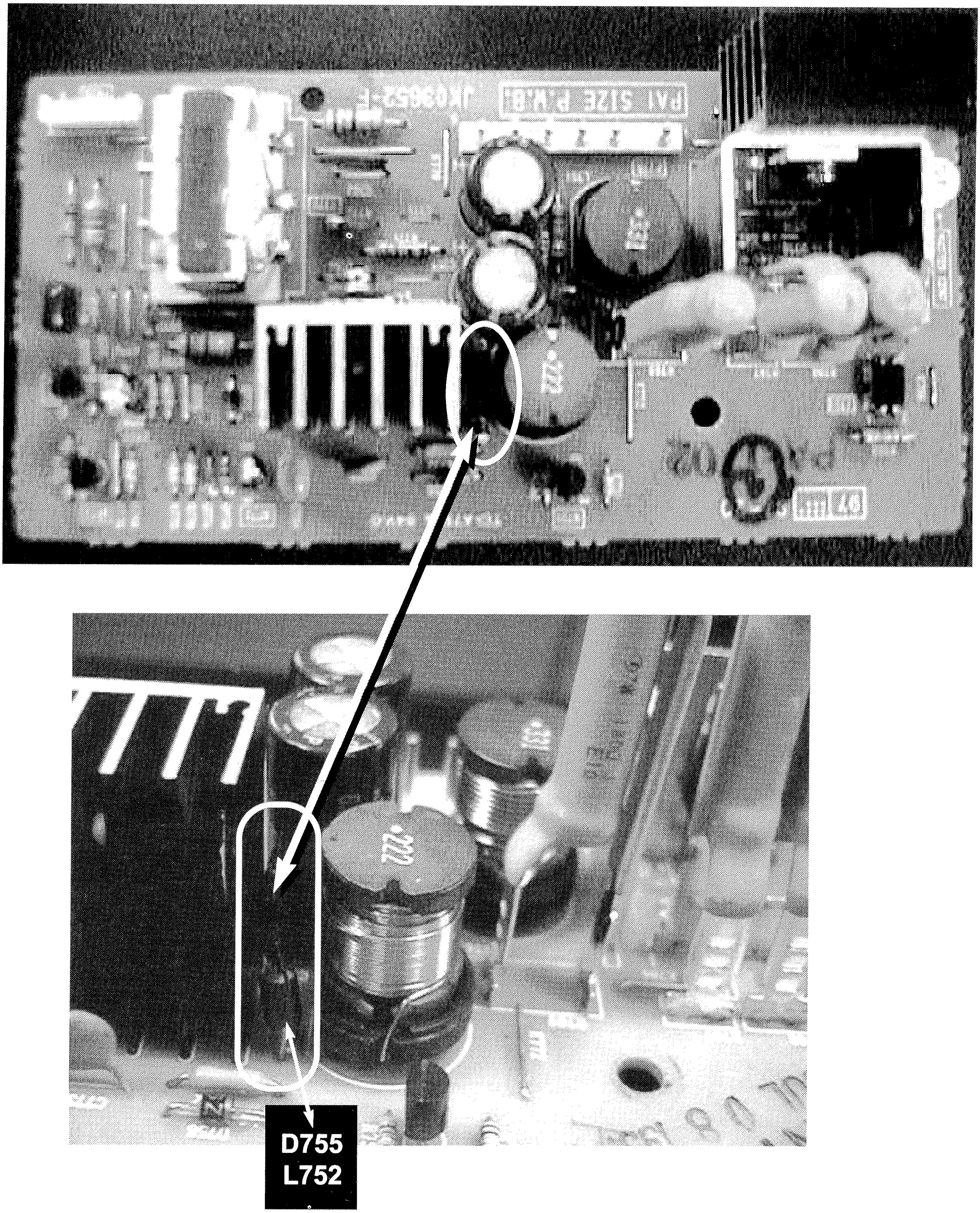

CP51
CP53
CP54

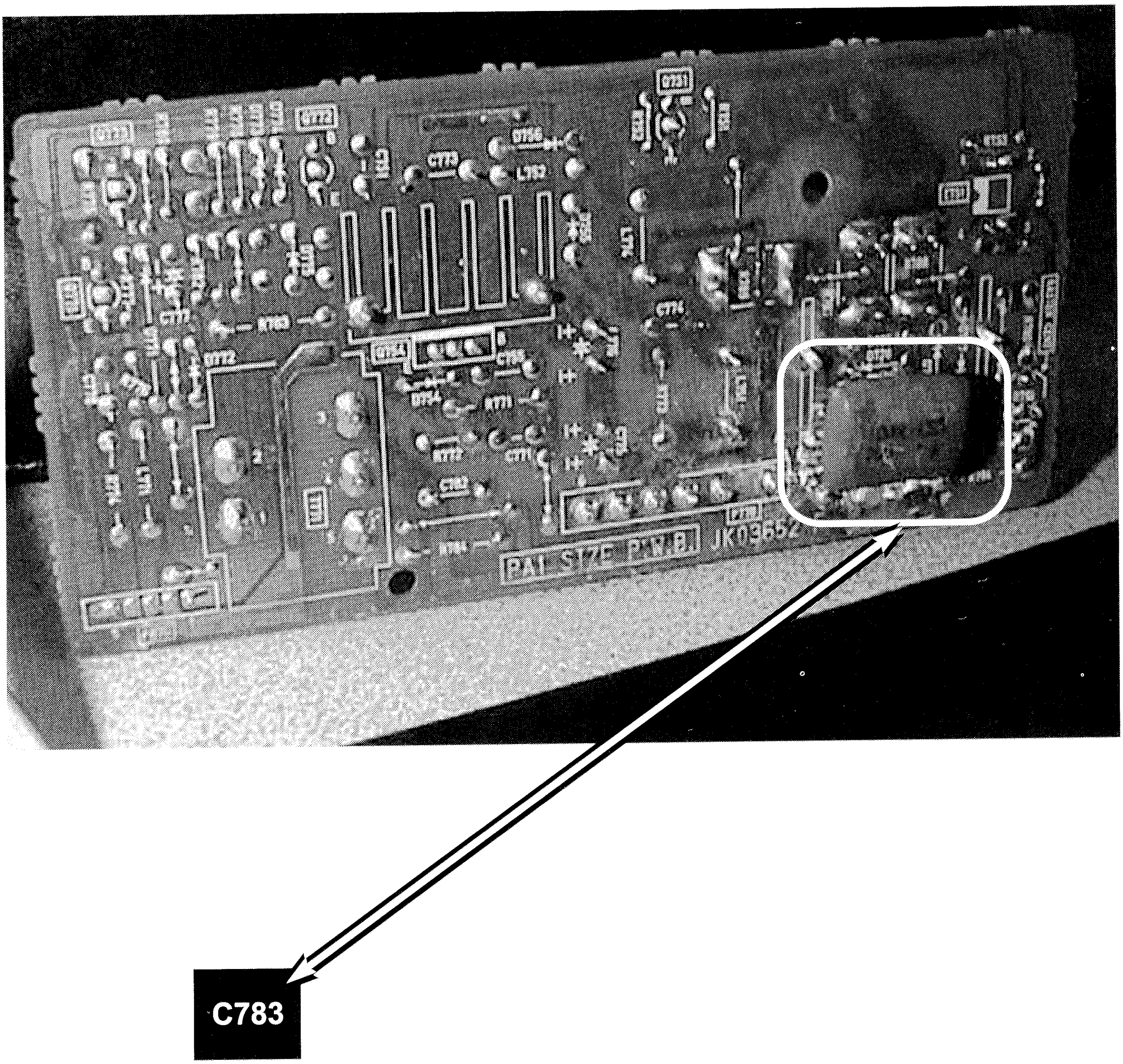

L856
R896
R894
L854
D828
D825
D826
D829
D827
D823
RR41
L855
R895
DD09A
DD09
DD10A
DD10
DD11A
DD11
DD12A
DD12

Component
Side
PA1 CPT
P.W.B.

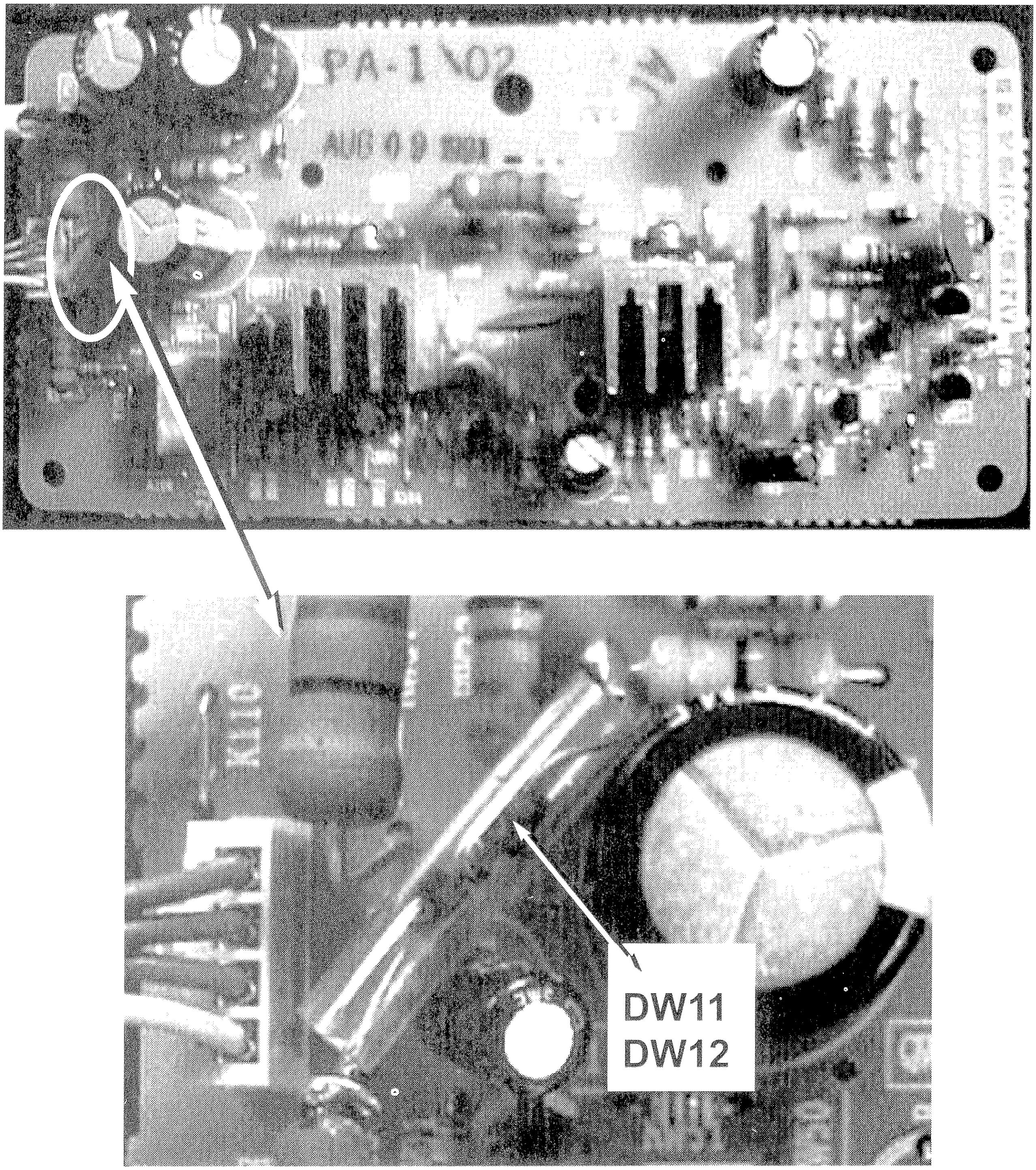
PA-1 H. SIZE P.W.B. - COMPONENT SIDE

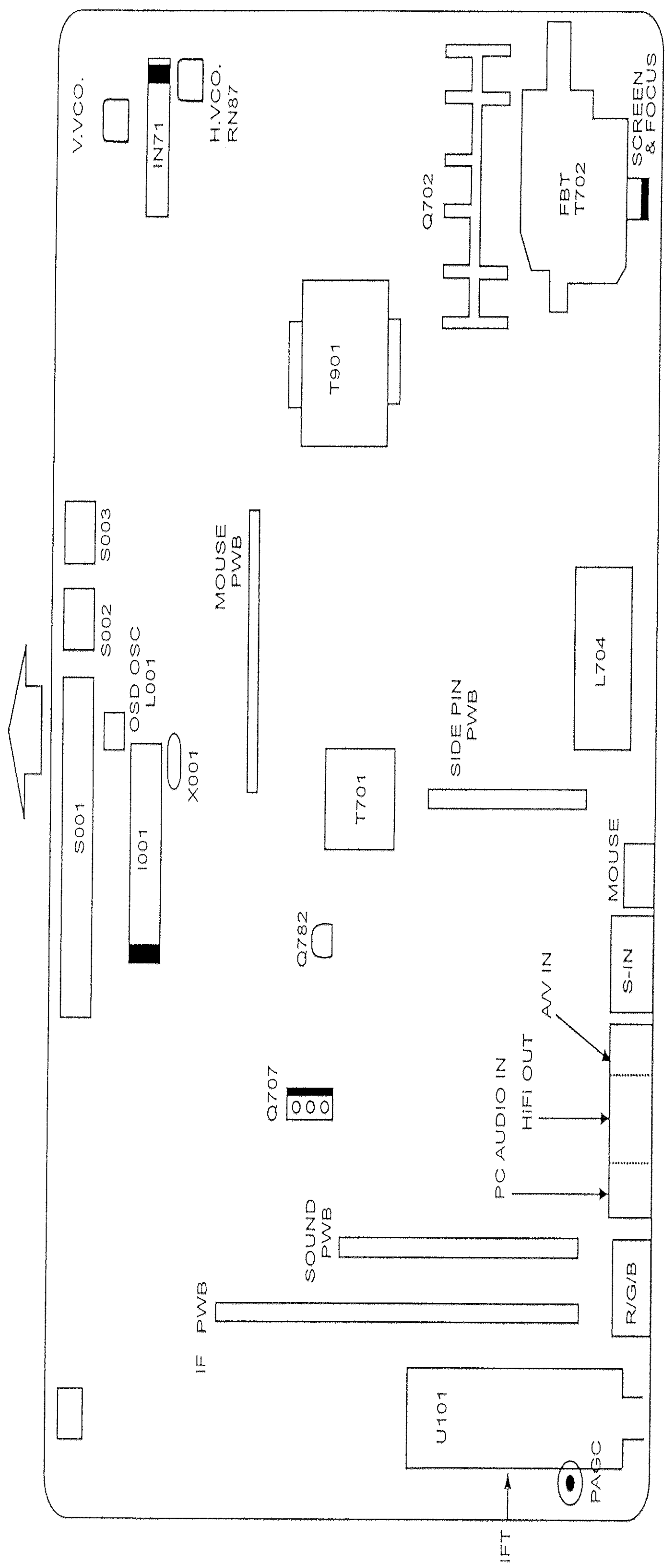

PA1 SIZE P.W.B.
D755
L752

Pattern
Side of
PA1 H. SIZE PWB

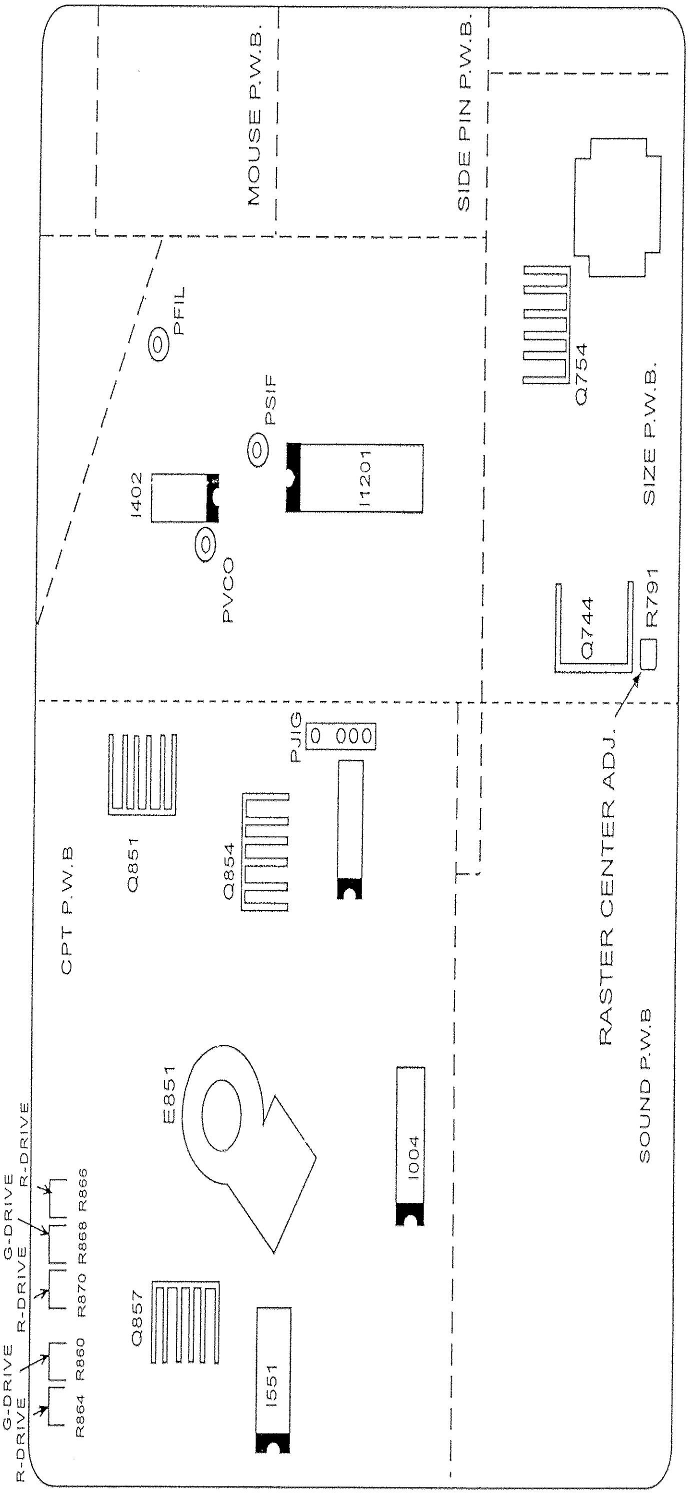

PA1 SIZE P.W.B.
JK03652
C783

PA-1 VM P.W.B. - COMPONENT SIDE


PA-1 V02
DW11
DW12



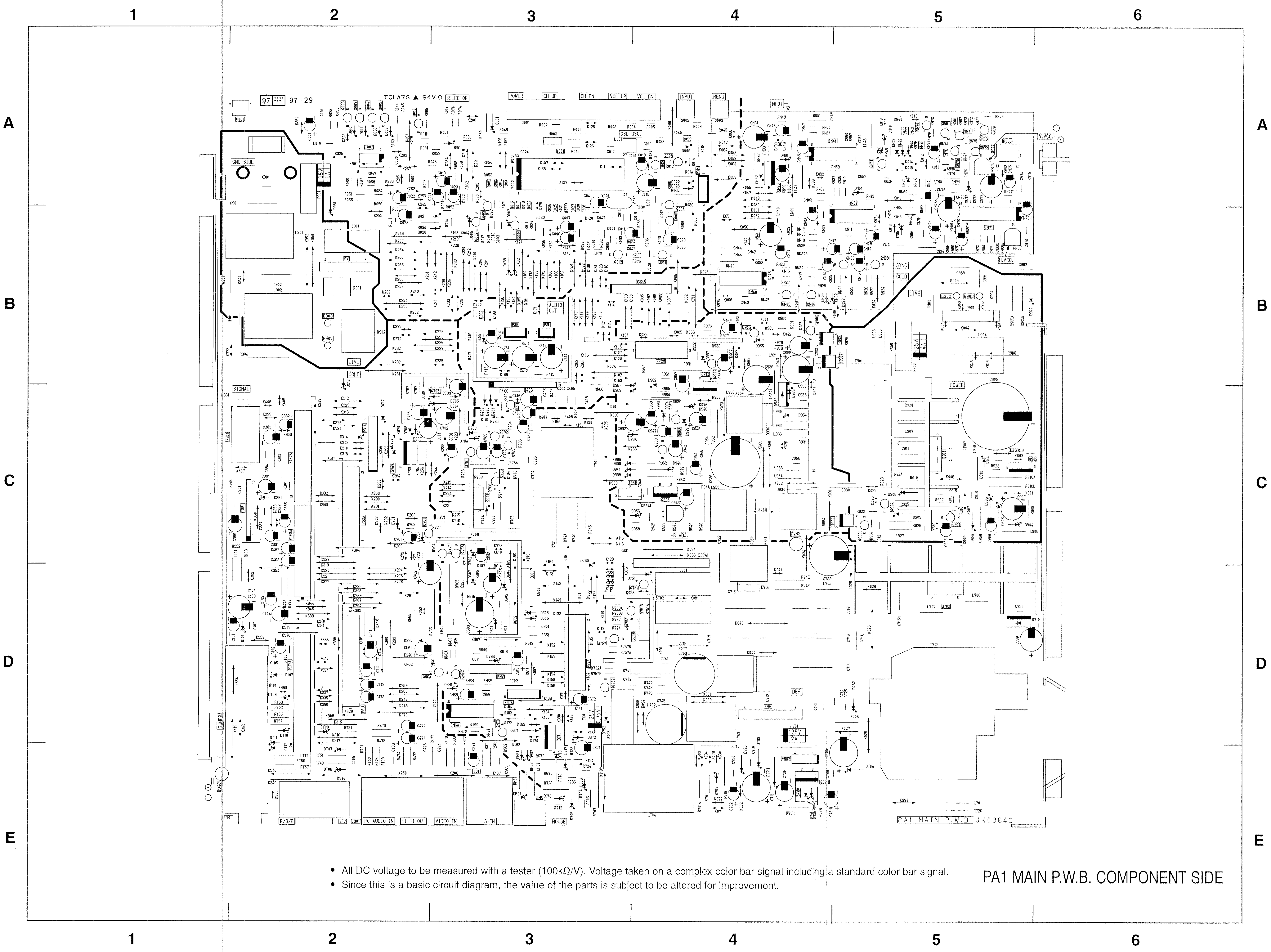
V.VCO.
IN71
H.VCO.
RN87
SCREEN
& FOCUS
FBT
T702
Q702
T901
S003
S002
OSD OSC
L001
S001
I001
X001
MOUSE
PWB
SIDE PIN
PWB
L704
T701
MOUSE
Q782
S-IN
A/V IN
Q707
PC AUDIO IN
HiFi OUT
SOUND
PWB
IF PWB
R/G/B
U101
PAGC
IFT



MOUSE P.W.B.
SIDE PIN P.W.B.
PFIL
PSIF
I402
I1201
PVCO
Q754
SIZE P.W.B.
Q744
R791
PJIG
Q851
Q854
CPT P.W.B
RASTER CENTER ADJ.
E851
I004
SOUND P.W.B
R-DRIVE
G-DRIVE
R-DRIVE
G-DRIVE
R-DRIVE
R864
R860
R870
R868
R866
Q857
I551

PRODUCT SAFETY NOTE: Components marked with a ⚠ and shaded have special characteristics important to safety. Before replacing any of these components, read carefully the PRODUCT SAFETY NOTICE of this Service Manual. Don't degrade the safety of the receiver through improper servicing.

PRINTED CIRCUIT BOARD


1
2
3
4
5
6
A
B
C
D
E
97-29
TCI-A7S ▲ 94V-0
SELECTOR
POWER
CH UP
CH DN
VOL UP
VOL DN
INPUT
MENU
GND SIDE
OSD OSC.
AUDIO OUT
V.VCO.
H.VCO.
SYNC
COLD
LIVE
SIGNAL
POWER
+B ADJ.
DEF.
TUNER
R/G/B
PC AUDIO IN
HI-FI OUT
VIDEO IN
S-IN
MOUSE
PA1 MAIN P.W.B. JK03643

- All DC voltage to be measured with a tester (100kΩ/V). Voltage taken on a complex color bar signal including a standard color bar signal.
- Since this is a basic circuit diagram, the value of the parts is subject to be altered for improvement.

PA1 MAIN P.W.B. COMPONENT SIDE

PRINTED CIRCUIT BOARD

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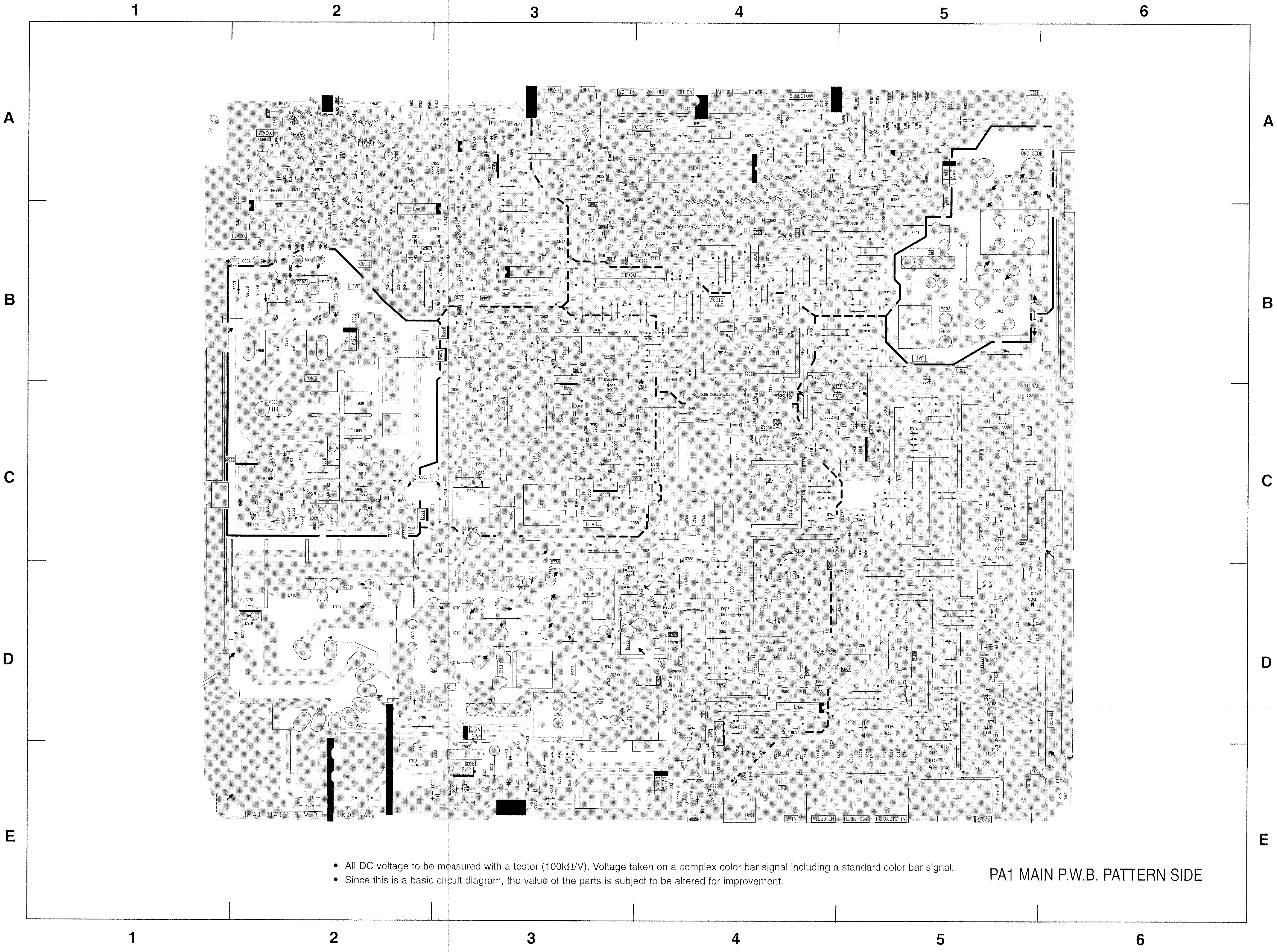
1
2
3
4
5
6
A
B
C
D
E
MENU
INPUT
VOL DN
VOL UP
CH DN
CH UP
POWER
SELECTOR
OSD OSC.
V.VCO
H.VCO
SYNC
COLD
LIVE
POWER
AUDIO OUT
GND SIDE
SIGNAL
+B ADJ
DEF.
TUNER
MOUSE
S-IN
VIDEO IN
HI-FI OUT
PC AUDIO IN
R/G/B
PA1 MAIN P.W.B.
JK03643

- All DC voltage to be measured with a tester (100kΩ/V). Voltage taken on a complex color bar signal including a standard color bar signal.
- Since this is a basic circuit diagram, the value of the parts is subject to be altered for improvement.

PA1 MAIN P.W.B. PATTERN SIDE

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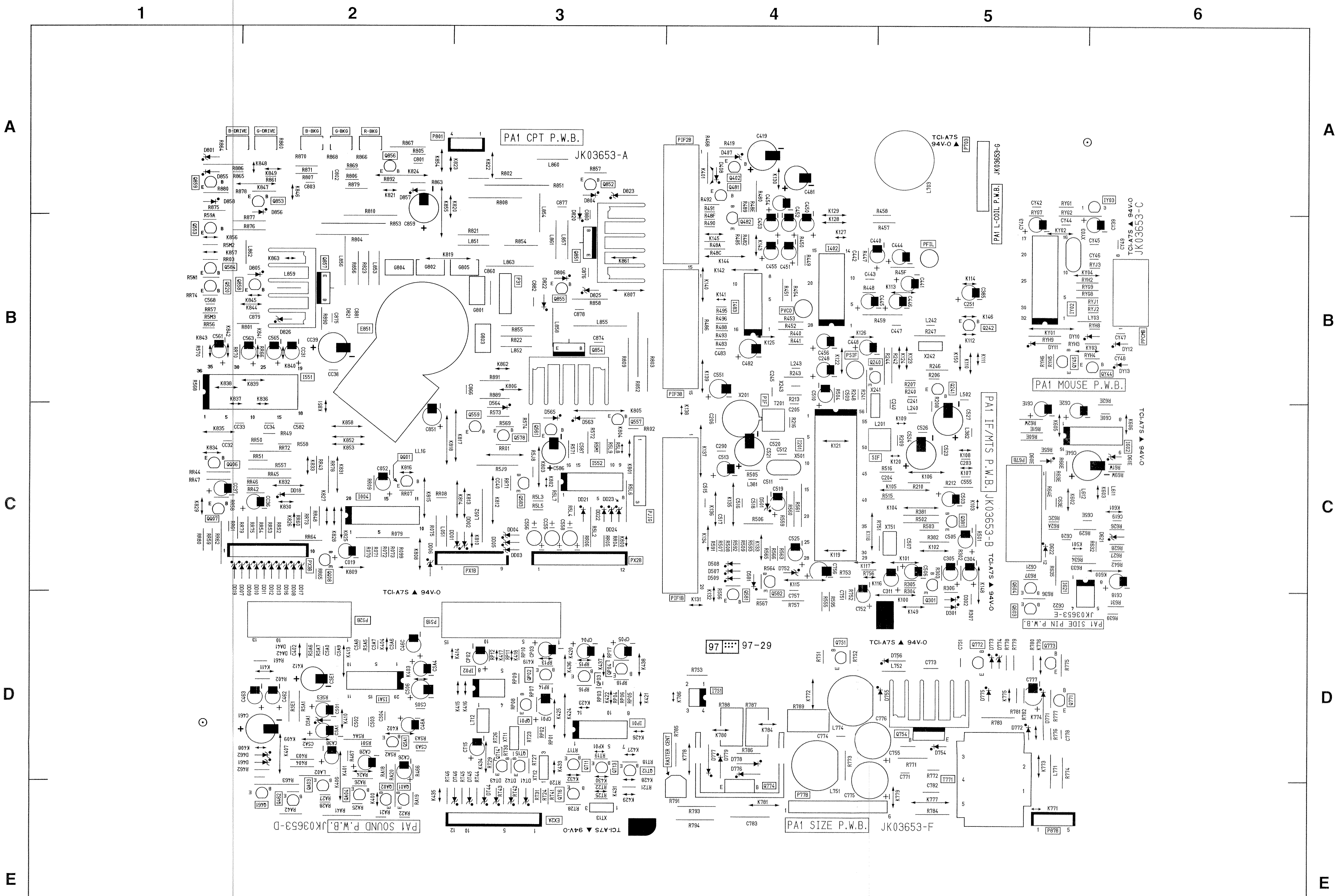
PRINTED CIRCUIT BOARD


1
2
3
4
5
6
A
B
C
D
E
PA1 CPT P.W.B.
JK03653-A
PA1 IF/MTS P.W.B.
JK03653-B
PA1 MOUSE P.W.B.
JK03653-C
PA1 SOUND P.W.B.
JK03653-D
PA1 SIDE PIN P.W.B.
JK03653-E
PA1 SIZE P.W.B.
JK03653-F
PA1 L-COIL P.W.B.
JK03653-G
TCI-A7S ▲ 94V-0
97-29

- All DC voltage to be measured with a tester (100kΩ/V). Voltage taken on a complex color bar signal including a standard color bar signal.
- Since this is a basic circuit diagram, the value of the parts is subject to be altered for improvement.

PA1 SUB P.W.B. COMPONENT SIDE

1 2 3 4 5 6

SUB P.W.B.
PATTERN SIDE

PRINTED CIRCUIT BOARD

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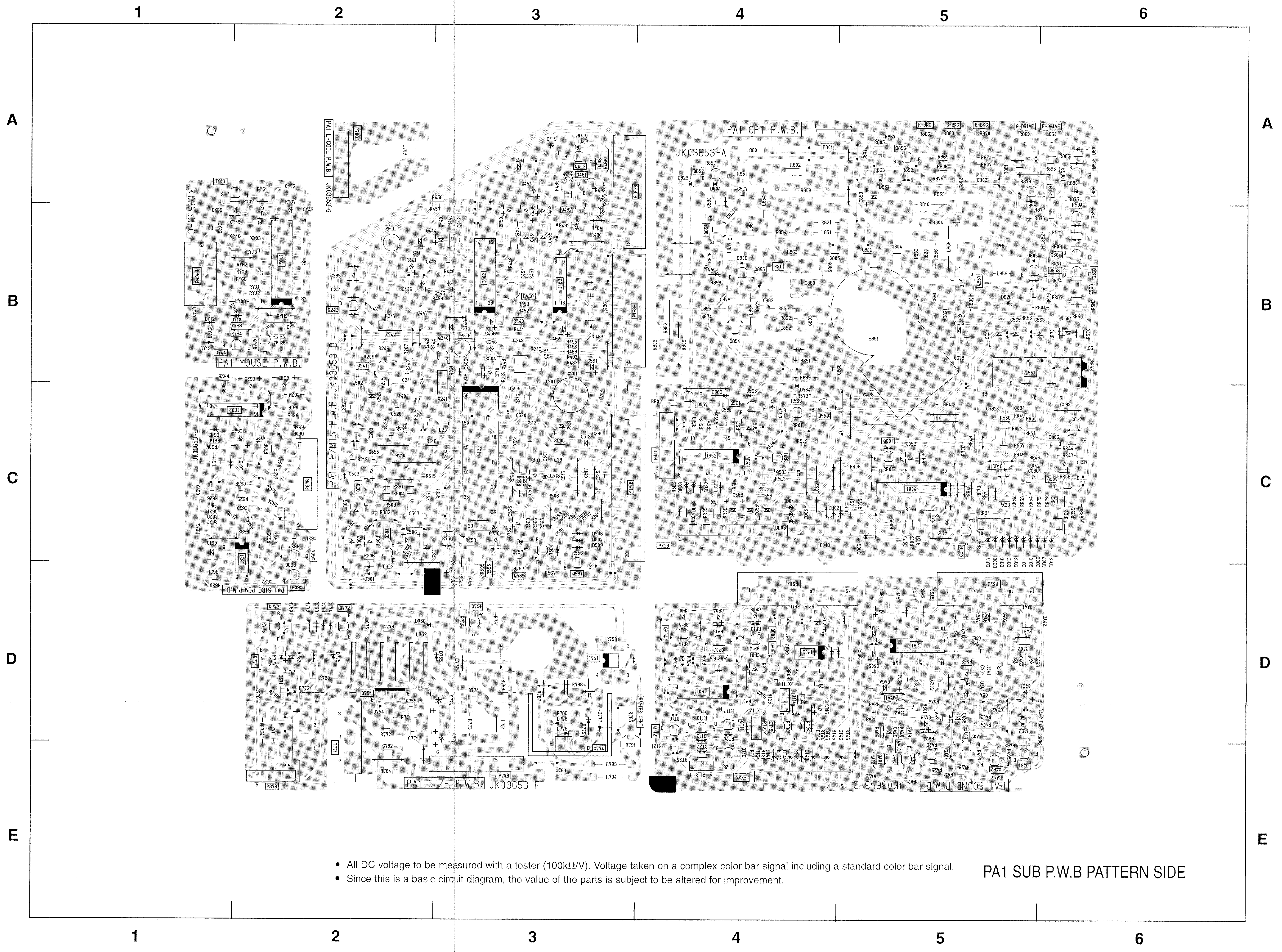
1
2
3
4
5
6
A
B
C
D
E
PA1 MOUSE P.W.B.
JK03653-C
PA1 SIDE PIN P.W.B.
JK03653-E
PA1 L-COIL P.W.B.
JK03653-G
PA1 IF/MTS P.W.B.
JK03653-B
PA1 CPT P.W.B.
JK03653-A
PA1 SIZE P.W.B.
JK03653-F
PA1 SOUND P.W.B.
JK03653-D
R-BKG
G-BKG
B-BKG
G-DRIVE
B-DRIVE
RASTER CENT

- All DC voltage to be measured with a tester (100kΩ/V). Voltage taken on a complex color bar signal including a standard color bar signal.
- Since this is a basic circuit diagram, the value of the parts is subject to be altered for improvement.

PA1 SUB P.W.B PATTERN SIDE

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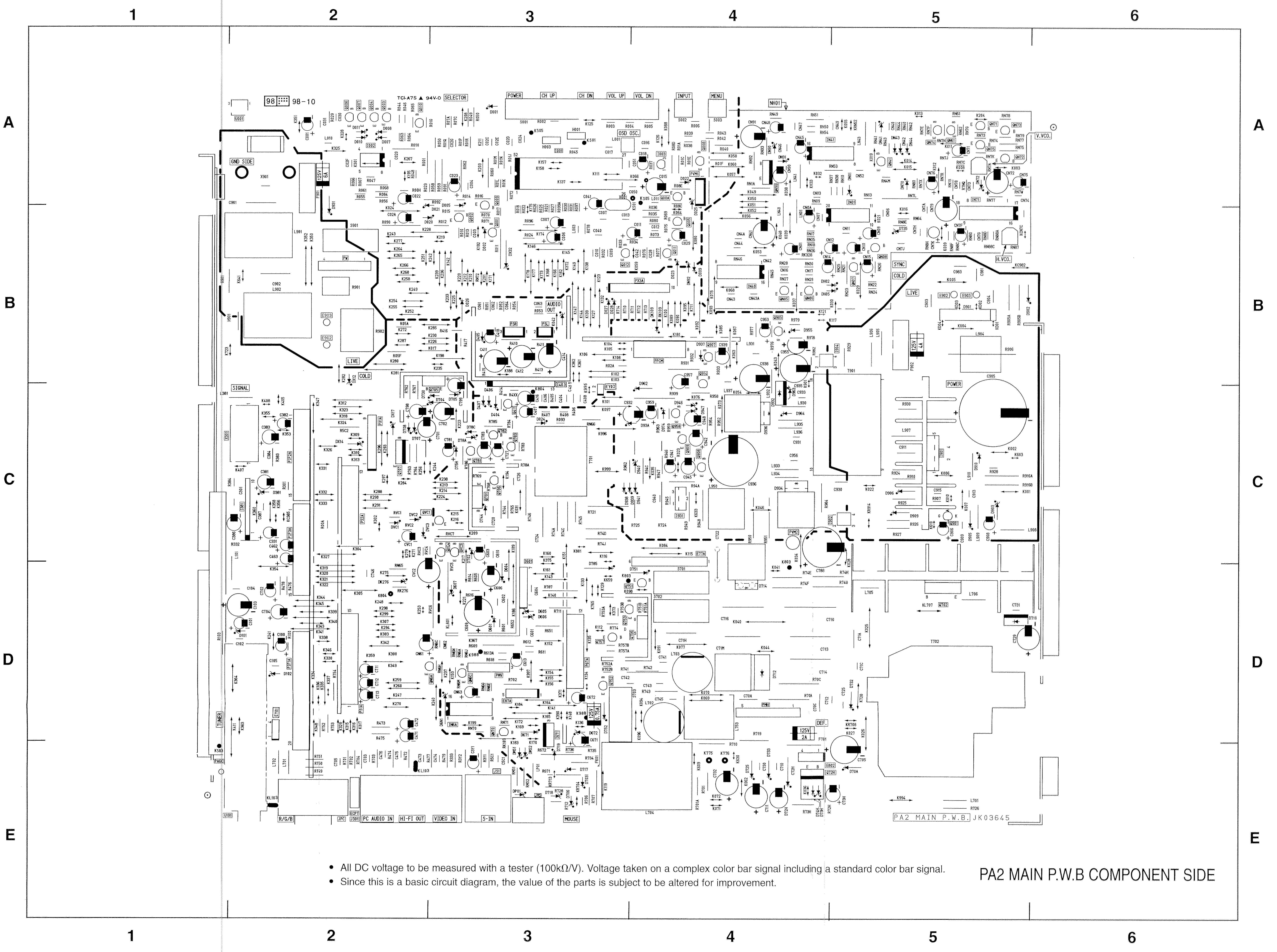
PRINTED CIRCUIT BOARD


1
2
3
4
5
6
A
B
C
D
E
POWER
CH UP
CH DN
VOL UP
VOL DN
INPUT
MENU
SELECTOR
GND SIDE
LIVE
COLD
SIGNAL
AUDIO OUT
OSD OSC.
SYNC
V.VCO.
H.VCO.
TUNER
R/G/B
PC AUDIO IN
HI-FI OUT
VIDEO IN
S-IN
MOUSE
DEF.
PA2 MAIN P.W.B. JK03645

- All DC voltage to be measured with a tester (100kΩ/V). Voltage taken on a complex color bar signal including a standard color bar signal.
- Since this is a basic circuit diagram, the value of the parts is subject to be altered for improvement.

PA2 MAIN P.W.B COMPONENT SIDE

PRINTED CIRCUIT BOARD

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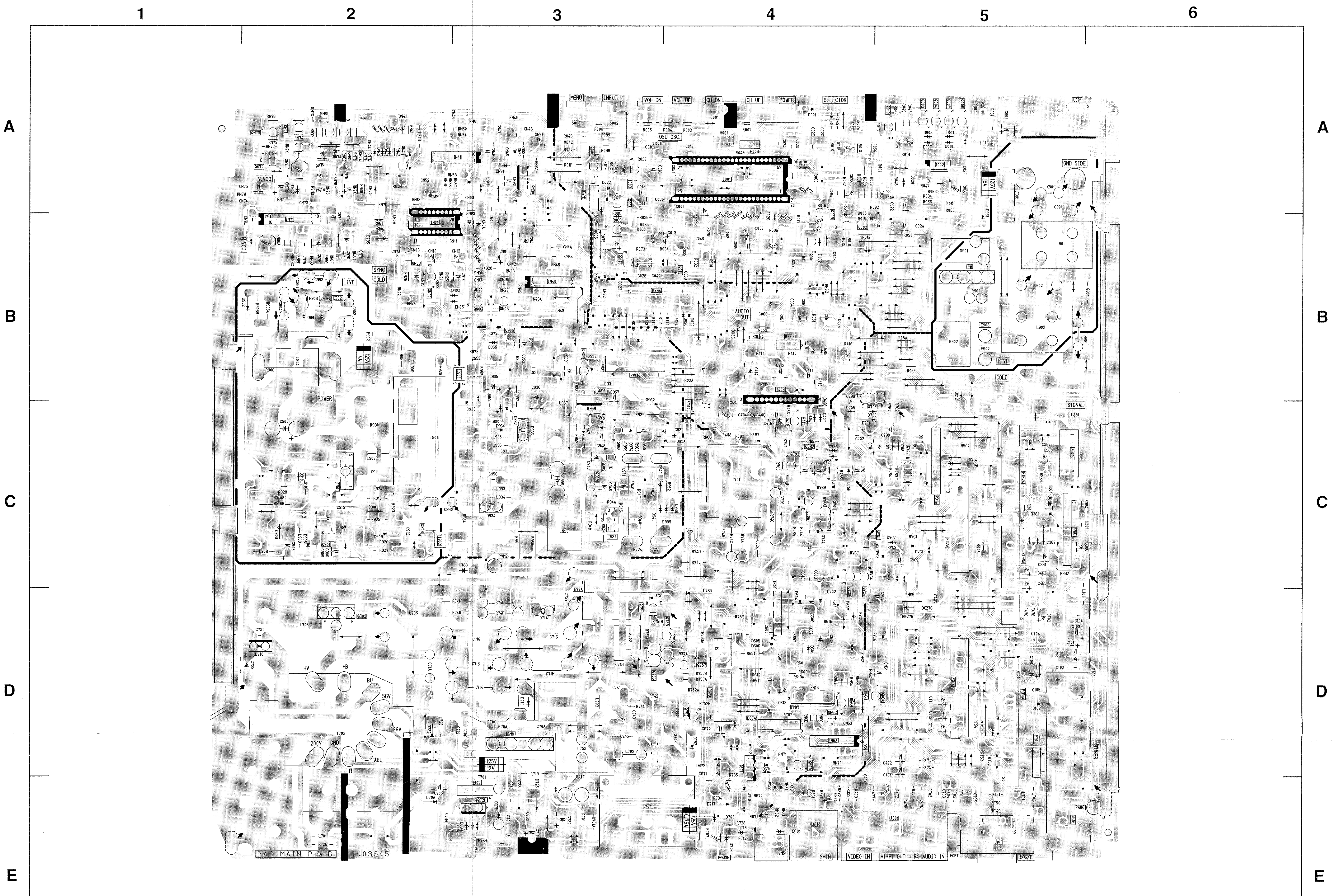
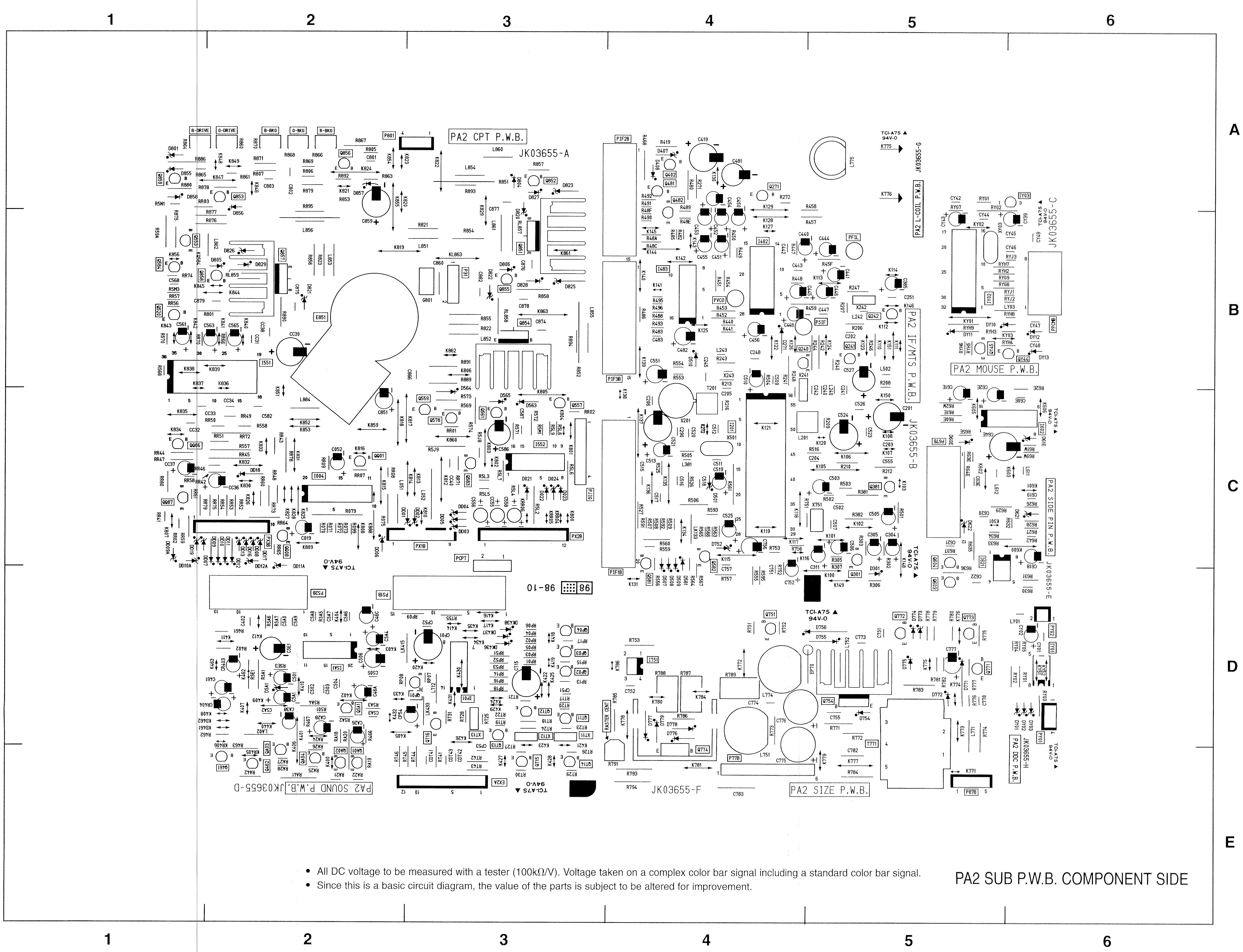

1
2
3
4
5
6
A
B
C
D
E
MENU
INPUT
VOL DN
VOL UP
CH DN
CH UP
POWER
SELECTOR
OSD OSC.
GND SIDE
V.VCO
SYNC
COLD
LIVE
POWER
AUDIO OUT
LIVE
COLD
SIGNAL
HV
+B
BU
56V
26V
200V
GND
ABL
DEF
125V 2A
TUNER
S-IN
VIDEO IN
HI-FI OUT
PC AUDIO IN
R/G/B
PA2 MAIN P.W.B.
JK03645

- All DC voltage to be measured with a tester (100kΩ/V). Voltage taken on a complex color bar signal including a standard color bar signal.
- Since this is a basic circuit diagram, the value of the parts is subject to be altered for improvement.

PA2 MAIN P.W.B. PATTERN SIDE

PRODUCT SAFETY NOTE: Components marked with a ⚠ and shaded have special characteristics important to safety. Before replacing any of these components, read carefully the PRODUCT SAFETY NOTICE of this Service Manual. Don't degrade the safety of the receiver through improper servicing.

PRINTED CIRCUIT BOARD


1
2
3
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5
6
A
B
C
D
E
PA2 CPT P.W.B.
JK03655-A
PA2 IF/MTS P.W.B.
JK03655-B
PA2 L-COIL P.W.B.
JK03655-G
PA2 MOUSE P.W.B.
JK03655-C
PA2 SIDE PIN P.W.B.
JK03655-E
PA2 SOUND P.W.B.
JK03655-D
JK03655-F
PA2 SIZE P.W.B.
PA2 DDC P.W.B.
JK03655-H
TCI-A7S 94V-0
98-10

- All DC voltage to be measured with a tester (100kΩ/V). Voltage taken on a complex color bar signal including a standard color bar signal.
- Since this is a basic circuit diagram, the value of the parts is subject to be altered for improvement.

PA2 SUB P.W.B. COMPONENT SIDE

PRINTED CIRCUIT BOARD

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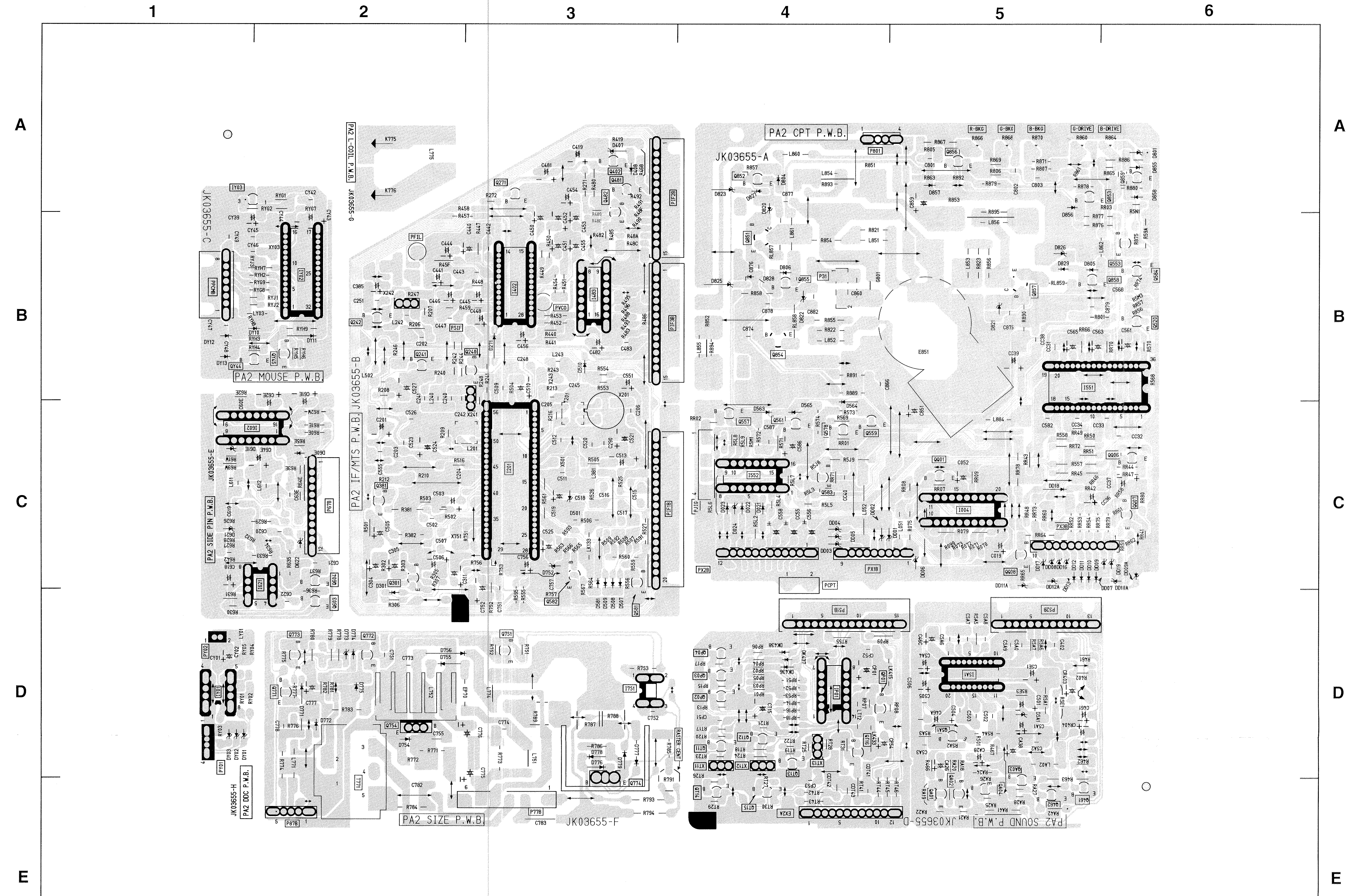
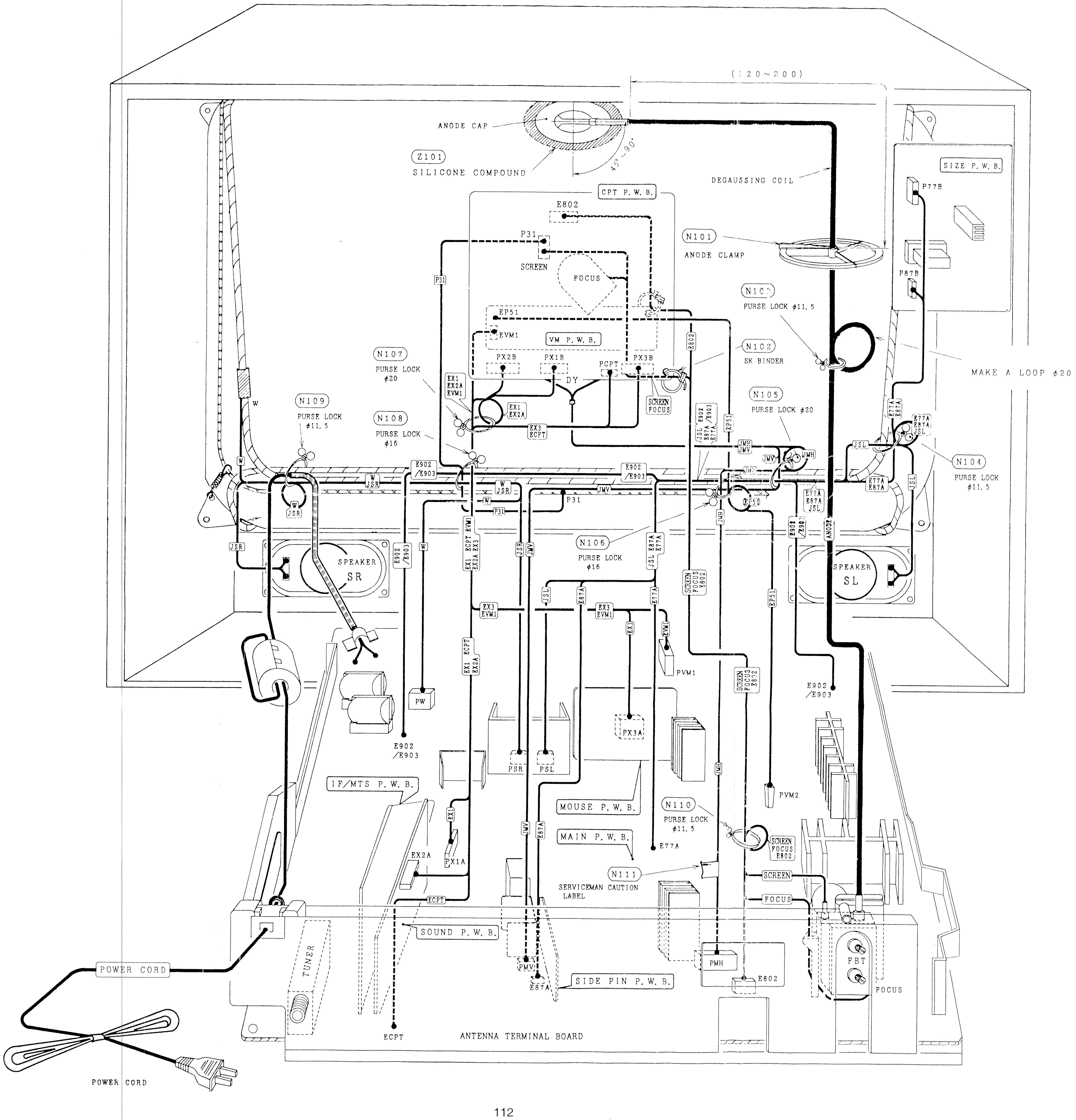

1
2
3
4
5
6
A
B
C
D
E
PA2 L-COIL P.W.B.
JK03655-G
JK03655-C
PA2 MOUSE P.W.B.
JK03655-B
PA2 IF/MTS P.W.B.
JK03655-E
PA2 SIDE PIN P.W.B.
PA2 CPT P.W.B.
JK03655-A
JK03655-H
PA2 DDC P.W.B.
PA2 SIZE P.W.B.
JK03655-F
JK03655-D
PA2 SOUND P.W.B.

- All DC voltage to be measured with a tester (100kΩ/V). Voltage taken on a complex color bar signal including a standard color bar signal.
- Since this is a basic circuit diagram, the value of the parts is subject to be altered for improvement.

PA2 SUB P.W.B. PATTERN SIDE

WIRING DRAWING OF 27MM20B/27MM20BA FINAL ASSEMBLY


(120~200)
ANODE CAP
Z101
SILICONE COMPOUND
45°~90°
DEGAUSSING COIL
SIZE P. W. B.
P77B
P87B
CPT P. W. B.
E802
P31
SCREEN
FOCUS
N101
ANODE CLAMP
N103
PURSE LOCK ϕ11. 5
EP51
EVM1
VM P. W. B.
N102
SK BINDER
MAKE A LOOP ϕ20
N107
PURSE LOCK
ϕ20
PX2B
PX1B
PCPT
PX3B
DY
EX1
EX2A
EVM1
EX3
ECPT
N105
PURSE LOCK ϕ20
N109
PURSE LOCK
ϕ11. 5
N108
PURSE LOCK
ϕ16
E902
/E903
JSR
W
JMV
JMH
JSL
E77A
E87A
N104
PURSE LOCK
ϕ11. 5
EP50
ANODE
N106
PURSE LOCK
ϕ16
SPEAKER
SR
SPEAKER
SL
PVM1
PW
PX3A
PSR
PSL
PVM2
IF/MTS P. W. B.
MOUSE P. W. B.
MAIN P. W. B.
N110
PURSE LOCK
ϕ11. 5
EX2A
PX1A
N111
SERVICEMAN CAUTION
LABEL
SCREEN
FOCUS
SOUND P. W. B.
TUNER
PMV
PMH
E802
FBT
FOCUS
SIDE PIN P. W. B.
POWER CORD
ECPT
ANTENNA TERMINAL BOARD
POWER CORD

BASIC CIRCUIT DIAGRAM

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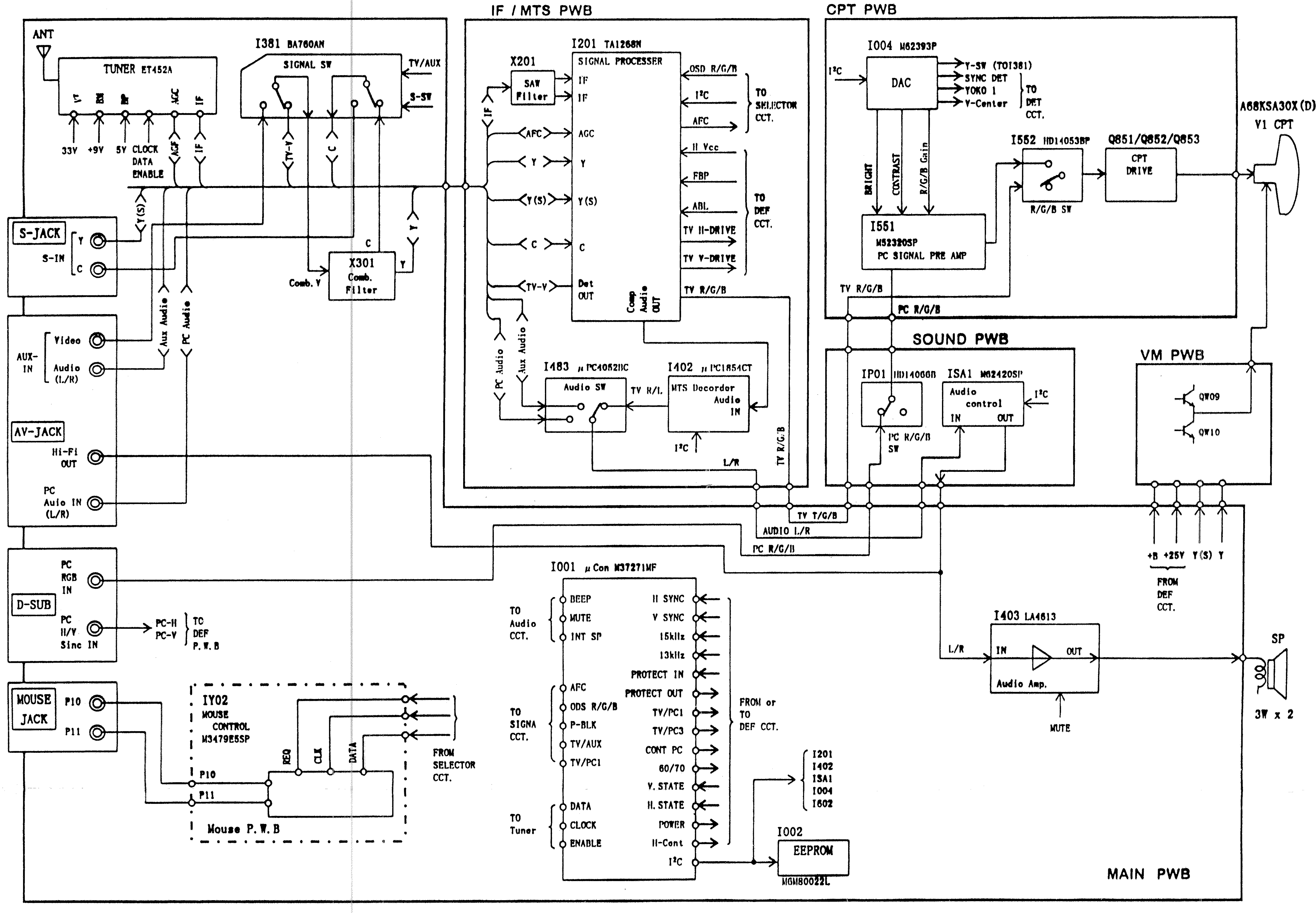
ANT
TUNER ET452A
VT
BM
BP
AGC
IF
33V
+9V
5V
CLOCK
DATA
ENABLE
I381 BA760AN
SIGNAL SW
TV/AUX
S-SW
TV-V
C
Y(S)
S-JACK
S-IN
Y
C
X301
Comb.
Filter
Comb. Y
AUX-IN
Video
Audio (L/R)
Aux Audio
PC Audio
AV-JACK
Hi-Fi OUT
PC Auio IN (L/R)
D-SUB
PC RGB IN
PC H/V Sinc IN
PC-H
PC-V
TC DEF P.W.B
MOUSE JACK
P10
P11
IY02
MOUSE CONTROL
M3479E5SP
REQ
CLK
DATA
Mouse P.W.B
FROM SELECTOR CCT.
IF / MTS PWB
X201
SAW Filter
I201 TA1268N
SIGNAL PROCESSER
IF
AFC
AGC
Y
Y(S)
C
TV-V
Det OUT
Comp Audio OUT
OSD R/G/B
I²C
TO SELECTOR CCT.
H Vcc
FBP
ABL
TV H-DRIVE
TV V-DRIVE
TO DEF CCT.
TV R/G/B
I483 μPC4052HC
Audio SW
TV R/L
I402 μPC1854CT
MTS Decorder
Audio IN
L/R
CPT PWB
I004 M62393P
DAC
Y-SW (TOI381)
SYNC DET
YOKO 1
V-Center
TO DET CCT.
BRIGHT
CONTRAST
R/G/B Gain
I551
M52320SP
PC SIGNAL PRE AMP
I552 HD14053BP
R/G/B SW
Q851/Q852/Q853
CPT DRIVE
A68KSA30X(D)
V1 CPT
PC R/G/B
SOUND PWB
IP01 HD14066B
PC R/G/B SW
ISA1 M62420SP
Audio control
IN
OUT
VM PWB
QW09
QW10
TV T/G/B
AUDIO L/R
+B
+25V
FROM DEF CCT.
I001 μCon M37271MF
TO Audio CCT.
BEEP
MUTE
INT SP
TO SIGNA CCT.
ODS R/G/B
P-BLK
TV/AUX
TV/PC1
TO Tuner
CLOCK
H SYNC
V SYNC
15kHz
13kHz
PROTECT IN
PROTECT OUT
TV/PC3
CONT PC
60/70
V. STATE
H. STATE
POWER
H-Cont
FROM or TO DEF CCT.
I201
I402
ISA1
I004
I602
I002
EEPROM
MGM80022L
I403 LA4613
Audio Amp.
SP
3W x 2
MAIN PWB

- All DC voltage to be measured with a tester (100kΩ/V). Voltage taken on a complex color bar signal including a standard color bar signal.
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PA1/PA2 CHASSIS BLOCK DIAGRAM

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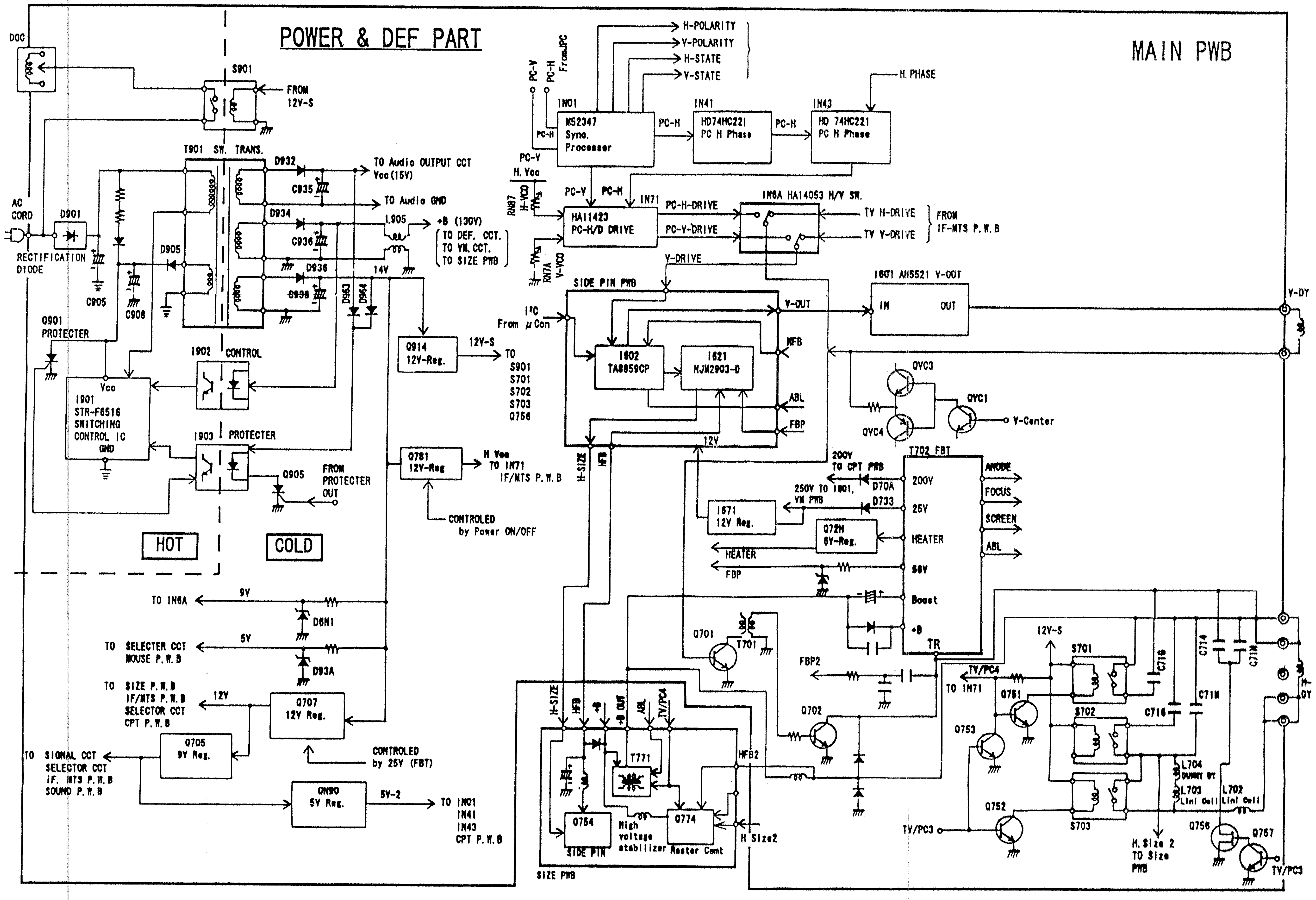
BASIC CIRCUIT DIAGRAM


POWER & DEF PART
MAIN PWB
DGC
S901
FROM 12V-S
T901 SW. TRANS.
D932
TO Audio OUTPUT CCT Vcc(15V)
C935
TO Audio GND
D934
L905
+B (130V)
TO DEF. CCT.
TO VM. CCT.
TO SIZE PWB
C936
D936
14V
C938
D963
D964
AC CORD
D901
RECTIFICATION DIODE
C905
C908
D905
Q901 PROTECTER
Vcc
I901 STR-F6516 SWITCHING CONTROL IC
GND
I902 CONTROL
I903 PROTECTER
Q905
FROM PROTECTER OUT
HOT
COLD
Q914 12V-Reg.
12V-S
TO S901 S701 S702 S703 Q756
Q781 12V-Reg
H Vcc TO IN71 IF/MTS P.W.B
CONTROLED by Power ON/OFF
TO IN6A
9V
D6N1
TO SELECTER CCT MOUSE P.W.B
5V
D93A
TO SIZE P.W.B IF/MTS P.W.B SELECTOR CCT CPT P.W.B
12V
Q707 12V Reg.
CONTROLED by 25V (FBT)
Q705 9V Reg.
TO SIGNAL CCT SELECTOR CCT IF. MTS P.W.B SOUND P.W.B
QN90 5V Reg.
5V-2
TO IN01 IN41 IN43 CPT P.W.B
PC-V
PC-H
From PC
H-POLARITY
V-POLARITY
H-STATE
V-STATE
IN01
M52347 Sync. Processer
PC-H
IN41
HD74HC221 PC H Phase
IN43
HD 74HC221 PC H Phase
H. PHASE
PC-V
H. Vcc
RN87
H-VCO
RN7A
V-VCO
PC-V
PC-H
IN71
HA11423 PC-H/D DRIVE
PC-H-DRIVE
PC-V-DRIVE
IN6A HA14053 H/V SW.
TV H-DRIVE
TV V-DRIVE
FROM IF-MTS P.W.B
V-DRIVE
SIDE PIN PWB
I²C From μCon
I602 TA8859CP
I621 NJM2903-D
V-OUT
NFB
ABL
FBP
12V
H-SIZE
HFB
I601 AN5521 V-OUT
IN
OUT
V-DY
QVC3
QVC1
QVC4
V-Center
T702 FBT
200V TO CPT PWB
D70A
250V TO I601, VM PWB
D733
I671 12V Reg.
Q72M 6V-Reg.
HEATER
FBP
200V
25V
HEATER
56V
Boost
+B
TR
ANODE
FOCUS
SCREEN
ABL
Q701
T701
FBP2
Q702
TV/PC4
TO IN71
12V-S
S701
C716
C714
C71M
Q751
Q753
S702
C716
C71M
L704 DUMMY DY
L703 Lini Coil
L702 Lini Coil
Q752
S703
TV/PC3
H. Size 2 TO Size PWB
Q756
Q757
TV/PC3
H-DY
H-SIZE
HFB
+B
+B OUT
ABL
TV/PC4
T771
HFB2
Q754
SIDE PIN
High voltage stabilizer
Q774
Raster Cont
H Size2
SIZE PWB

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PA1/PA2 CHASSIS BLOCK DIAGRAM

BASIC CIRCUIT DIAGRAM

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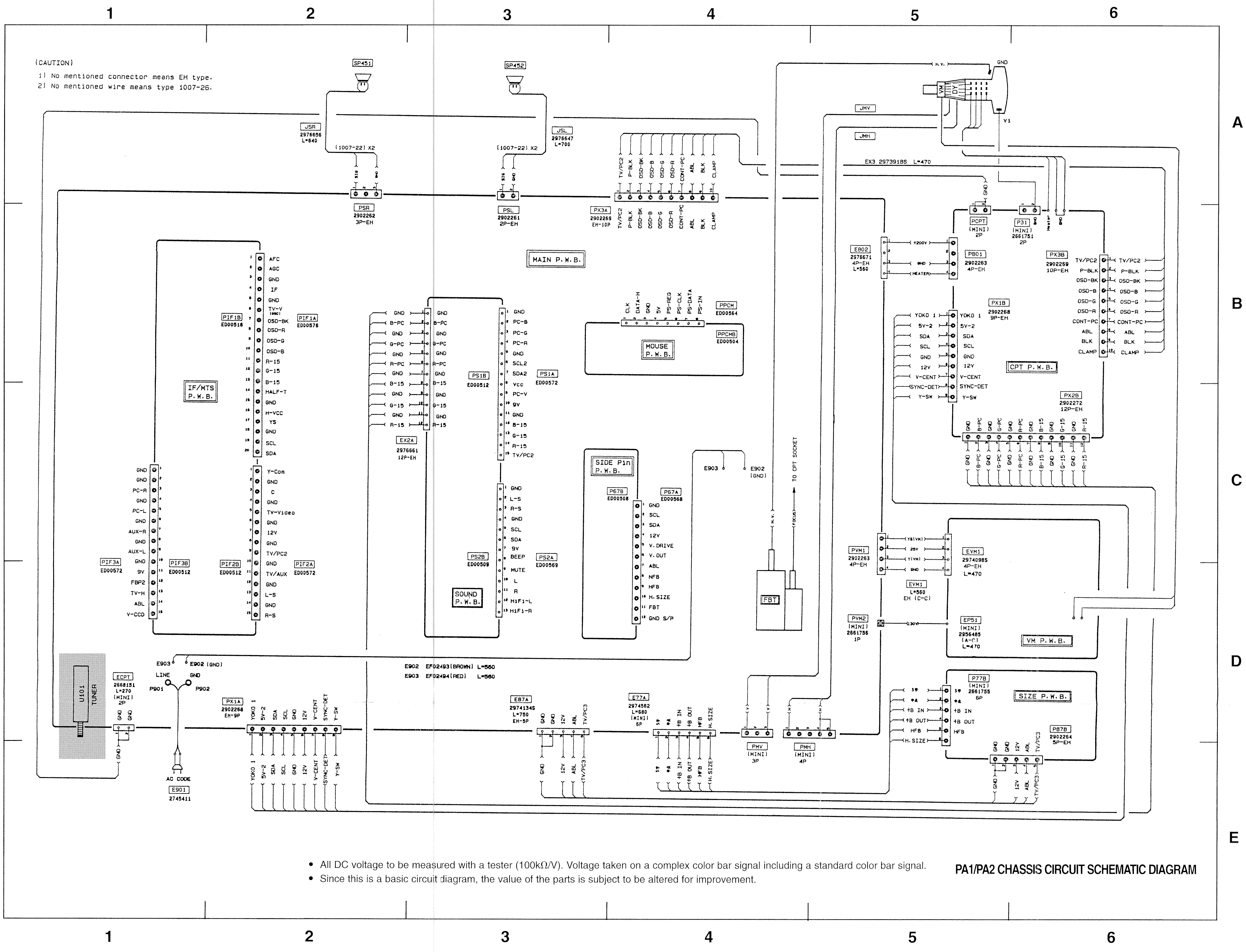
1
2
3
4
5
6
A
B
C
D
E
SP451
SP452
JSR
2976656
L=640
(1007-22) X2
JSL
2976647
L=700
PSR
2902262
3P-EH
PSL
2902261
2P-EH
PX3A
2902259
EH-10P
TV/PC2
P-BLK
OSD-BK
OSD-B
OSD-G
OSD-R
CONT-PC
ABL
BLK
CLAMP
MAIN P.W.B.
IF/MTS
P.W.B.
PIF1B
ED00516
PIF1A
ED00576
AFC
AGC
GND
IF
TV-V
HALF-T
H-VCC
Y5
SCL
SDA
R-15
G-15
B-15
PIF3A
ED00572
PIF3B
ED00512
PIF2B
ED00512
PIF2A
ED00572
PC-R
PC-L
AUX-R
AUX-L
9V
FBP2
TV-H
V-CCD
Y-Com
C
TV-Video
12V
TV/AUX
L-S
R-S
EX2A
2976661
12P-EH
B-PC
G-PC
R-PC
PS1B
ED00512
PS1A
ED00572
PC-B
PC-G
PC-R
SCL2
SDA2
Vcc
PC-V
PS2B
ED00509
PS2A
ED00569
SOUND
P.W.B.
BEEP
MUTE
L
R
HiFi-L
HiFi-R
PPCM
ED00564
PPCMB
ED00504
MOUSE
P.W.B.
CLK
DATA-H
5V
PS-REQ
PS-CLK
PS-DATA
PS-IN
SIDE Pin
P.W.B.
P67B
ED00508
P67A
ED00568
V. DRIVE
V. OUT
NFB
HFB
H. SIZE
FBT
GND S/P
E903
E902
(GND)
TO CPT SOCKET
H.V.
FOCUS
FBT
JMV
JMH
VM
DY
V1
EX3 2973918S L=470
PCPT
(MINI)
2P
P31
(MINI)
2661751
2P
HEATER
E802
2975671
4P-EH
L=560
PB01
2902263
4P-EH
+200V
PX3B
2902259
10P-EH
PX1B
2902268
9P-EH
YOKO 1
5V-2
V-CENT
SYNC-DET
Y-SW
CPT P.W.B.
PX2B
2902272
12P-EH
PVM1
2902263
4P-EH
EVM1
2974098S
4P-EH
L=470
EVM1
L=560
EH (C-C)
PVM2
(MINI)
2661756
1P
EP51
(MINI)
2956485
(A-C)
L=470
VM P.W.B.
P77B
(MINI)
2661755
6P
SIZE P.W.B.
+B IN
+B OUT
P87B
2902264
5P-EH
TV/PC3
U101
TUNER
ECPT
2668151
L=270
(MINI)
2P
E903
E902 (GND)
LINE
P901
P902
AC CODE
E901
2745411
PX1A
2902268
EH-9P
E902 EF02493(BROWN) L=560
E903 EF02494(RED) L=560
E87A
2974134S
L=750
EH-5P
E77A
2974562
L=580
(MINI)
6P
PMV
(MINI)
3P
PMH
(MINI)
4P

(CAUTION)
1) No mentioned connector means EH type.
2) No mentioned wire means type 1007-26.

- All DC voltage to be measured with a tester (100kΩ/V). Voltage taken on a complex color bar signal including a standard color bar signal.
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PA1/PA2 CHASSIS CIRCUIT SCHEMATIC DIAGRAM

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BASIC CIRCUIT DIAGRAM

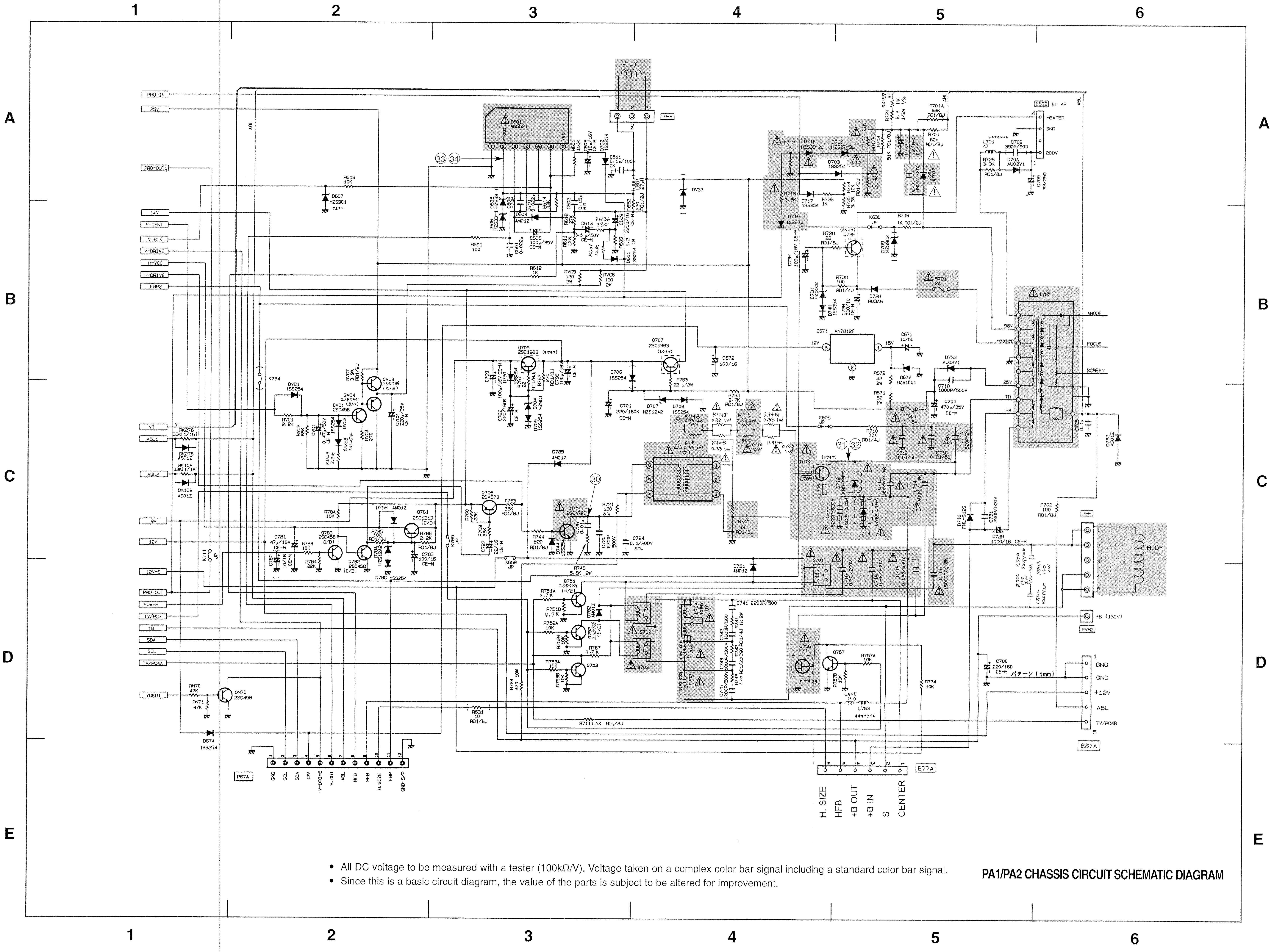
circuit no.	pin no.	DC voltage
I 601	1	0v
	2	13.15v
	3	26.7v
	4	0.73v
	5	0v
	6	1.49v
	7	26.2v

circuit no.	pin no.	DC votage
I671	1	15.9v
	2	0v
	3	11.7v

circuit no.	pin no.	DC votage
QVC1	b	1.7v
	c	10.4
	e	1.1v
circuit no.	pin no.	DC votage
QVC3	b	10.4v
	c	25.7v
	e	11.0v
circuit no.	pin no.	DC votage
QVC4	b	10.4v
	c	0v
	e	11v
circuit no.	pin no.	DC voltage
Q 701	b	0.35v
	c	74.51v
	e	0v
circuit no.	pin no.	DC voltage
Q702	b	0.91v
	c	137.13v
	e	0v
circuit no.	pin no.	DC voltage
Q 705	b	9.94v
	c	12.21v
	e	9.33v
circuit no.	pin no.	DC voltage
Q 706	b	13.4v
	c	0.834v
	e	13.46v
circuit no.	pin no.	DC voltage
Q 707	b	12.8v
	c	13.4v
	e	12.2v

circuit no.	pin no.	DC voltage
Q 72H	b	6.7v
	c	7.3v
	e	6.1v

circuit no.	pin no.	DC Voltage	
		TV mode	PC mode
Q751	b	0.6v	0v
	c	0v	11.5v
	e	0v	0
circuit no.	pin no.	DC Voltage	
		TV mode	PC mode
Q752	b	0v	0.6v
	c	11.5v	0v
	e	0v	0v
circuit no.	pin no.	DC Voltage	
		TV mode	PC mode
Q753	b	0v	0.6v
	c	6.8v	0v
	e	0v	0v


1
2
3
4
5
6
A
B
C
D
E
V. DY
PRO-IN
25V
PRO-OUT1
14V
V-CENT
V-BLK
V-DRIVE
H-VCC
H-DRIVE
FBP2
VT
ABL1
ABL2
9V
12V
12V-S
PRO-OUT
POWER
TV/PC3
+B
SDA
SCL
TV/PC4A
YOKO1
I601 AN5521
I671 AN7812F
T702
T701
F701 2A
ANODE
FOCUS
SCREEN
HEATER
GND
200V
H. DY
+B (130V)
GND
GND
+12V
ABL
TV/PC4B
E87A
E77A
P67A
GND
SCL
SDA
12V
V-DRIVE
V.OUT
ABL
HFB
HFB
H. SIZE
FBP
GND-S/P
H. SIZE
HFB
+B OUT
+B IN
S
CENTER
Q701 2SC4793
Q702
Q705 2SC1983
Q706 2SA673
Q707 2SC1983
Q72H
Q751 2SD789
Q752
Q753
Q756 FET
Q757
Q781 2SC1213
Q782 2SC458
Q783 2SC458
QN70 2SC458
QVC1 2SC458
QVC3 2SD789
QVC4 2SB740
S701
S702
S703
(30)
(31)
(32)
(33)
(34)

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PA1/PA2 CHASSIS CIRCUIT SCHEMATIC DIAGRAM

circuit no.	pin no.	DC Voltage	
		TV mode	PC mode
Q756	d	0v	95.2v
	g	11.5v	0v
	s	0v	0v
circuit no.	pin no.	DC Voltage	
		TV mode	PC mode
Q757	b	0v	0.6v
	c	11.5v	0v
	e	0v	0v
circuit no.	pin no.	DC voltage	
Q781	b	12.1v	
	c	13.3v	
	e	11.5v	

circuit no.	pin no.	DC voltage
Q782	b	0v
	c	12.1v
	e	0v
circuit no.	pin no.	DC voltage
Q783	b	0.6v
	c	0v
	e	0v
circuit no.	pin no.	DC voltage
QN70	b	0v
	c	3.6v
	e	0v

BASIC CIRCUIT DIAGRAM

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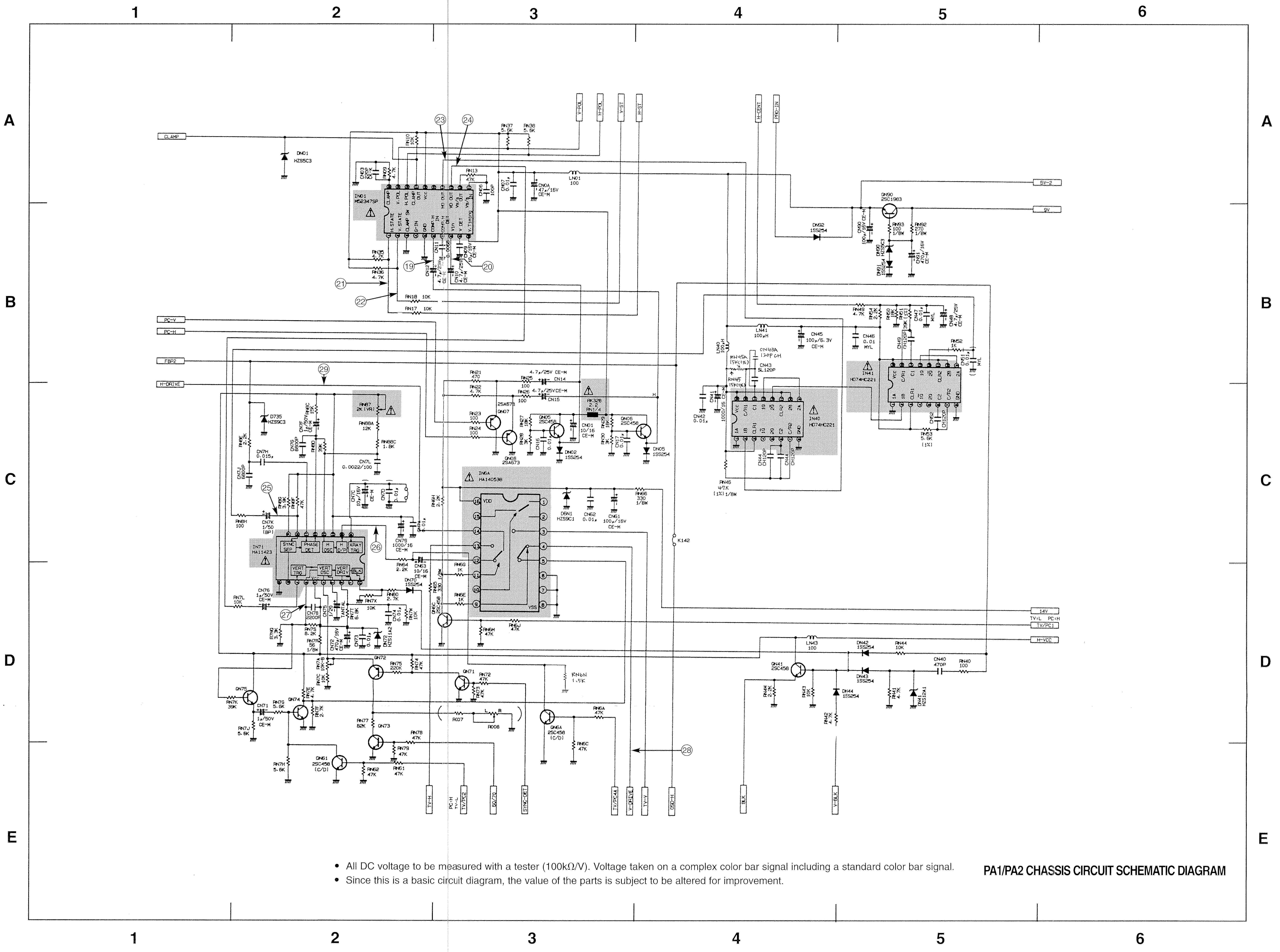
1
2
3
4
5
6
A
B
C
D
E
CLAMP
DN01
HZS5C3
IN01
M52347SP
V-POL
H-POL
V-ST
H-ST
H-CENT
PRO-IN
5V-2
9V
QN90
2SC1983
DN92
1SS254
PC-V
PC-H
FBP2
H-DRIVE
IN41
HD74HC221
IN40
HD74HC221
QN07
2SA673
QN05
2SC458
QN06
2SC458
QN08
2SA673
DN02
1SS254
DN05
1SS254
RK32B
IN6A
HA14053B
D6N1
HZS9C1
IN71
HA11423
D735
HZS9C3
K142
14V
TV-L PC-H
TV/PC1
H-VCC
QN41
2SC458
DN42
1SS254
DN43
1SS254
DN44
1SS254
QN75
QN74
QN72
QN73
QN71
QN61
2SC458
QN6A
2SC458
(C/D)
TV-H
PC-H
TV-L
TV/PC2
50/20
SYNC-DET
TV/PC4A
V-DRIVE
TV-V
OSD-H
BLK
V-BLK
⑲
⑳
㉑
㉒
㉓
㉔
㉕
㉖
㉗
㉘
㉙

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PA1/PA2 CHASSIS CIRCUIT SCHEMATIC DIAGRAM

circuit no.	pin no.	DC volt / PC mode
IN40	1	0v
	2	0.85v
	3	5.43v
	4	4v
	5	2.1v
	6	0v
	7	3.4v
	8	0v
	9	1.3v
	10	5.43v
	11	5.43v
	12	3.3v
	13	1.4v
	14	0v
	15	4v
	16	5.43v

circuit no.	pin no.	DC volt / PC mode
IN41	1	0v
	2	3.3v
	3	5.43v
	4	3.55v
	5	0.12v
	6	0v
	7	5.26v
	8	0v
	9	1.86v
	10	5.43v
	11	5.43v
	12	5.28v
	13	1.86v
	14	0v
	15	3.2v
	16	5.43v

circuit no.	pin no.	DC volt / PC mode
IN71	1	7.2v
	2	5.82v
	3	5.27v
	4	3.25v
	5	9.89v
	6	2.8v
	7	2.8v
	8	2.3v
	9	11.14v
	10	11.25v
	11	3.14v
	12	5.89v
	13	5.92v
	14	11.29v
	15	2.8v
	16	0v
	17	0v
	18	0v

circuit no.	pin no.	PC mode	TV mode
IN6A	1	0.16v	0.16v
	2	0.19v	0.19v
	3	3.72v	3.66v
	4	4v	3.66v
	5	4v	4v
	6	0v	0v
	7	0v	0v
	8	0v	0v
	9	0v	9.16v
	10	0v	0v
	11	0v	9.16v
	12	0.5v	0.1v
	13	1v	0.9v
	14	0.4v	0.8v
	15	.13v	0v
	16	7.71v	9.16v

circuit no.	pin no.	DC voltage	
		TV mode	PC mode
QN05	b	0.55v	0.55v
	c	5.34v	5.35v
	e	0.14v	0.37v
QNO6	b	0.55v	0.55v
	c	5.34v	5.34v
	e	0.14v	.45v
QNO7	b	8.6v	1.47v
	c	0v	0v
	e	9.2v	2.12v
QNO8	b	0.16v	1.2v
	c	0v	0v
	e	0.7v	1.8v
QN41	b	0.9v	0.9v
	c	11.25v	11.33v
	e	0.78v	0.8v

QN61	b	0.6v	0v
	c	0v	0v
	e	0v	0v
QN71	b	0v	0.6v
	c	11.19v	0v
	e	0v	0v
QN72	b	10.96v	2.73v
	c	0v	3.25v
	e	3.25v	3.26v
QN73	b	0v	0v
	c	0v	3.23v
	e	0v	0v
QN74	b	0v	0v
	c	4.1v	4.1v
	e	0v	0v
QN75	b	2.7v	2.7v
	c	11.25v	11.33v
	e	2.1v	2.11v

circuit no.	pin no.	DC voltatage	
		TV mode	PC mode
QN90	b	6v	6v
	c	9.3v	9.3v
	e	5.45v	5.45v
QN6A	b	0.6v	0v
	c	0v	2.22v
	e	0v	0v
QN6C	b	0v	0.6v
	c	9v	0v
	e	0v	0v

circuit no.	pin no.	DC volt / PC mode
IN01	1	4.3v
	2	4.3v
	3	0v
	4	3.3v
	5	0v
	6	2.5v
	7	0.7v
	8	2.5v
	9	1.1v
	10	5.34v
	11	1v
	12	0.8v
	13	0.2v
	14	0.8v
	15	4.7v
	16	5.34v
	17	0.3v
	18	1.62v
	19	1.62v
	20	3.17v

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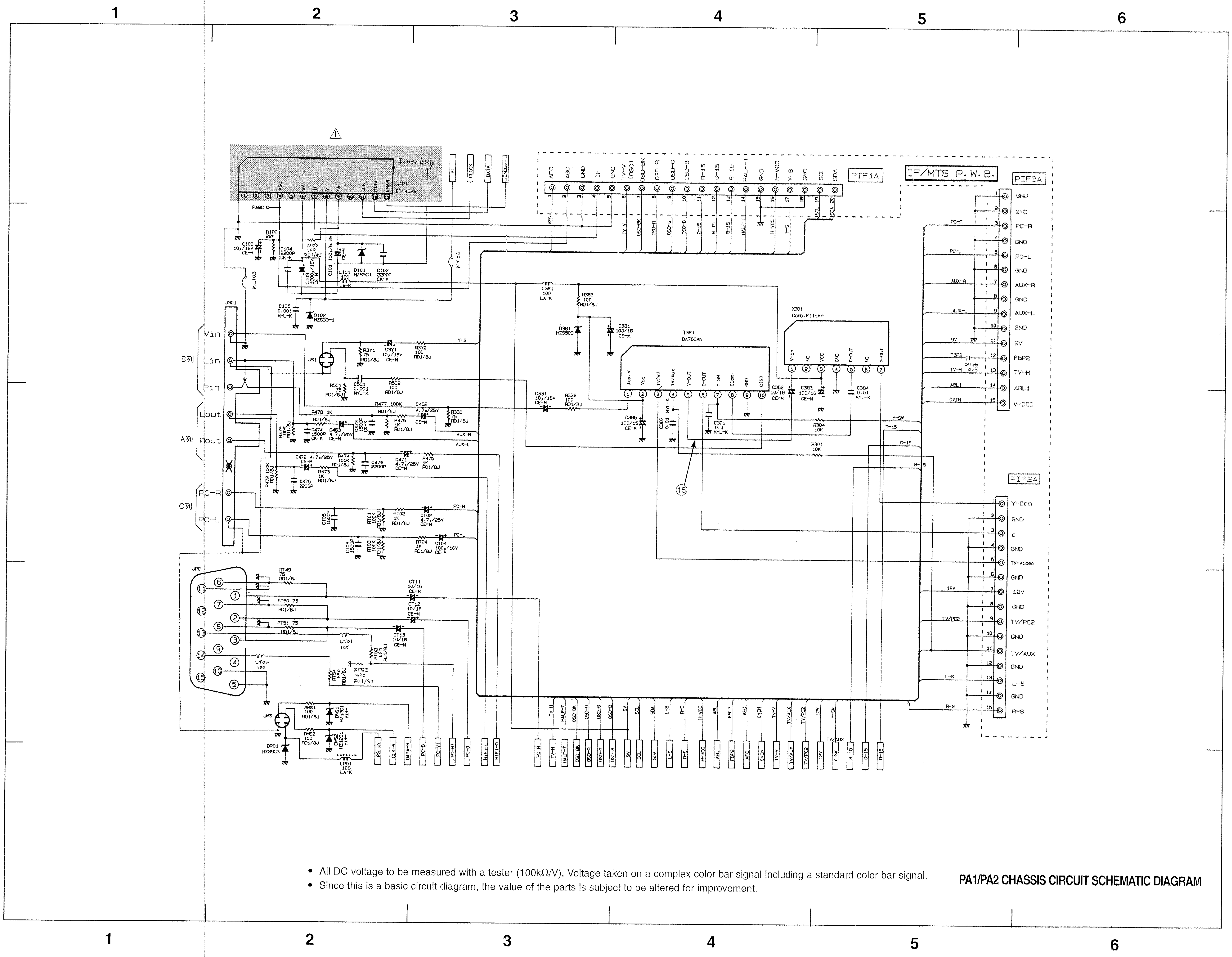
BASIC CIRCUIT DIAGRAM

circuit no.	pin no.	DC voltage
I381	1	2.59v
	2	5.35v
	3	2.56v
	4	0.90v
	5	1.83v
	6	1.83v
	7	0.95v
	8	2.55v
	9	0v
	10	2.59v


1
2
3
4
5
6
A
B
C
D
E
Tuner Body
U101
ET-452A
AGC
9V
IF
VT
CLK
DATA
ENABL
VT
CLOCK
DATA
ENBL
AFC
AGC
GND
IF
GND
TV-V (OSC)
OSD-BK
OSD-R
OSD-G
OSD-B
R-15
G-15
B-15
HALF-T
GND
H-VCC
Y-S
GND
SCL
SDA
PIF1A
IF/MTS P.W.B.
PIF3A
GND
GND
PC-R
GND
PC-L
GND
AUX-R
GND
AUX-L
GND
9V
FBP2
TV-H
ABL 1
V-CCD
J301
Vin
Lin
Rin
Lout
Rout
PC-R
PC-L
B列
A列
C列
JS1
I381
BA7604N
X301
Comb. Filter
Y-in
NC
Vcc
GND
C-OUT
NC
Y-OUT
AUX.V
Vcc
TV(V)
TV/Aux
Y-OUT
C-OUT
Y-SW
CCom.
GND
C(S)
L381
100
LA-K
R383
100
RD1/8J
D381
HZS5C3
C381
100/16
CE-M
⑮
PIF2A
Y-Com
GND
C
GND
TV-Video
GND
12V
GND
TV/PC2
GND
TV/AUX
GND
L-S
GND
R-S
JPC
JHS
DP01
HZS9C3
LP01
100
LA-K
PC-R
TV-H
HALF-T
OSD-BK
OSD-R
OSD-G
OSD-B
9V
SCL
SDA
L-S
R-S
H-VCC
ABL
FBP2
AFC
CVIN
TV-V
TV/AUX
TV/PC2
12V
Y-SW
B-15
G-15
R-15
PS-IN
CLK-M
DATA-M
PC-B
PC-V
PC-HI
PC-G
HIF1-L
HIF1-R

- All DC voltage to be measured with a tester (100kΩ/V). Voltage taken on a complex color bar signal including a standard color bar signal.
- Since this is a basic circuit diagram, the value of the parts is subject to be altered for improvement.

PA1/PA2 CHASSIS CIRCUIT SCHEMATIC DIAGRAM

BASIC CIRCUIT DIAGRAM

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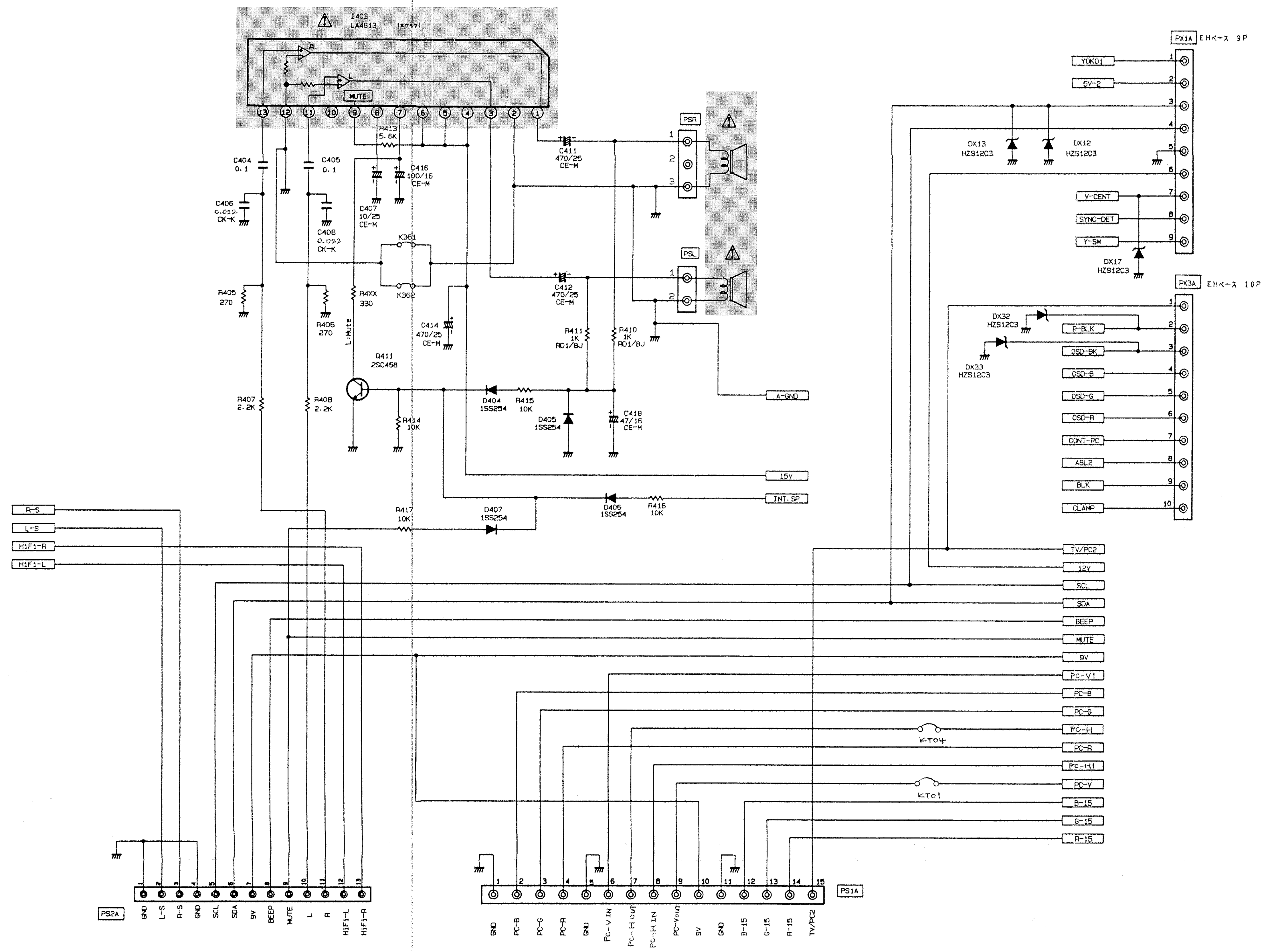
circuit no.	pin no.	DC voltage
I403	1	7.33v
	2	0v
	3	7.21v
	4	15v
	5	15v
	6	15v
	7	7.39v
	8	10.41v
	9	2.88v
	10	0v
	11	1.44v
	12	0v
	13	1.44v

circuit no.	pin no.	DC voltage
Q411	b	0v
	c	7.39v
	e	0v


1
2
3
4
5
6
A
B
C
D
E
I403
LA4613
(ﾎｳﾈﾂ)
R
L
MUTE
C404
0.1
C405
0.1
C406
0.022
CK-K
C408
0.022
CK-K
C407
10/25
CE-M
C416
100/16
CE-M
R413
5.6K
K361
K362
R405
270
R406
270
R4XX
330
L:Mute
Q411
2SC458
C414
470/25
CE-M
C411
470/25
CE-M
C412
470/25
CE-M
R411
1K
RD1/8J
R410
1K
RD1/8J
PSR
PSL
R407
2.2K
R408
2.2K
R414
10K
D404
1SS254
R415
10K
D405
1SS254
C418
47/16
CE-M
A-GND
15V
INT.SP
R417
10K
D407
1SS254
D406
1SS254
R416
10K
R-S
L-S
HIF1-R
HIF1-L
PX1A
EHベース 9P
YOKO1
5V-2
DX13
HZS12C3
DX12
HZS12C3
V-CENT
SYNC-DET
Y-SW
DX17
HZS12C3
PX3A
EHベース 10P
DX32
HZS12C3
DX33
HZS12C3
P-BLK
OSD-BK
OSD-B
OSD-G
OSD-R
CONT-PC
ABL2
BLK
CLAMP
TV/PC2
12V
SCL
SDA
BEEP
MUTE
9V
PC-V1
PC-B
PC-G
PC-H
PC-R
PC-H1
PC-V
B-15
G-15
R-15
KT04
KT01
PS2A
GND
L-S
R-S
GND
SCL
SDA
9V
BEEP
MUTE
L
R
HIFI-L
HIFI-R
PS1A
GND
PC-B
PC-G
PC-R
GND
Pc-V IN
Pc-H OUT
Pc-H IN
PC-VOUT
9V
GND
B-15
G-15
R-15
TV/PC2

- All DC voltage to be measured with a tester (100kΩ/V). Voltage taken on a complex color bar signal including a standard color bar signal.
- Since this is a basic circuit diagram, the value of the parts is subject to be altered for improvement.

PA1/PA2 CHASSIS CIRCUIT SCHEMATIC DIAGRAM

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BASIC CIRCUIT DIAGRAM

circuit no.	pin no.	DC voltage	
		TV mode	PC mode
I001	1	4.18v	4.05
	2	4.72v	4.72v
	3	2.54v	2.54v
	4	4.94v	4.9v
	5	3.72v	1.85v
	6	4.97v	0.38v
	7	0v	0v
	8	4.89v	4.73v
	9	4.99v	4.95v
	10	0v	4.86v
	11	0v	1.74v
	12	0v	0v
	13	0v	0v
	14	0v	0v
	15	4.97v	4.93v
	16	4.97v	4.94v
	17	4.98v	4.94v
	18	4.98v	4.94v
	19	2.11v	2.81v
	20	2.11v	2.79v
	21	0.16v	0.1v
	22	2.17v	1.52v
	23	0v	0v
	24	2.21v	2.4v
	25	1.8v	1.81v

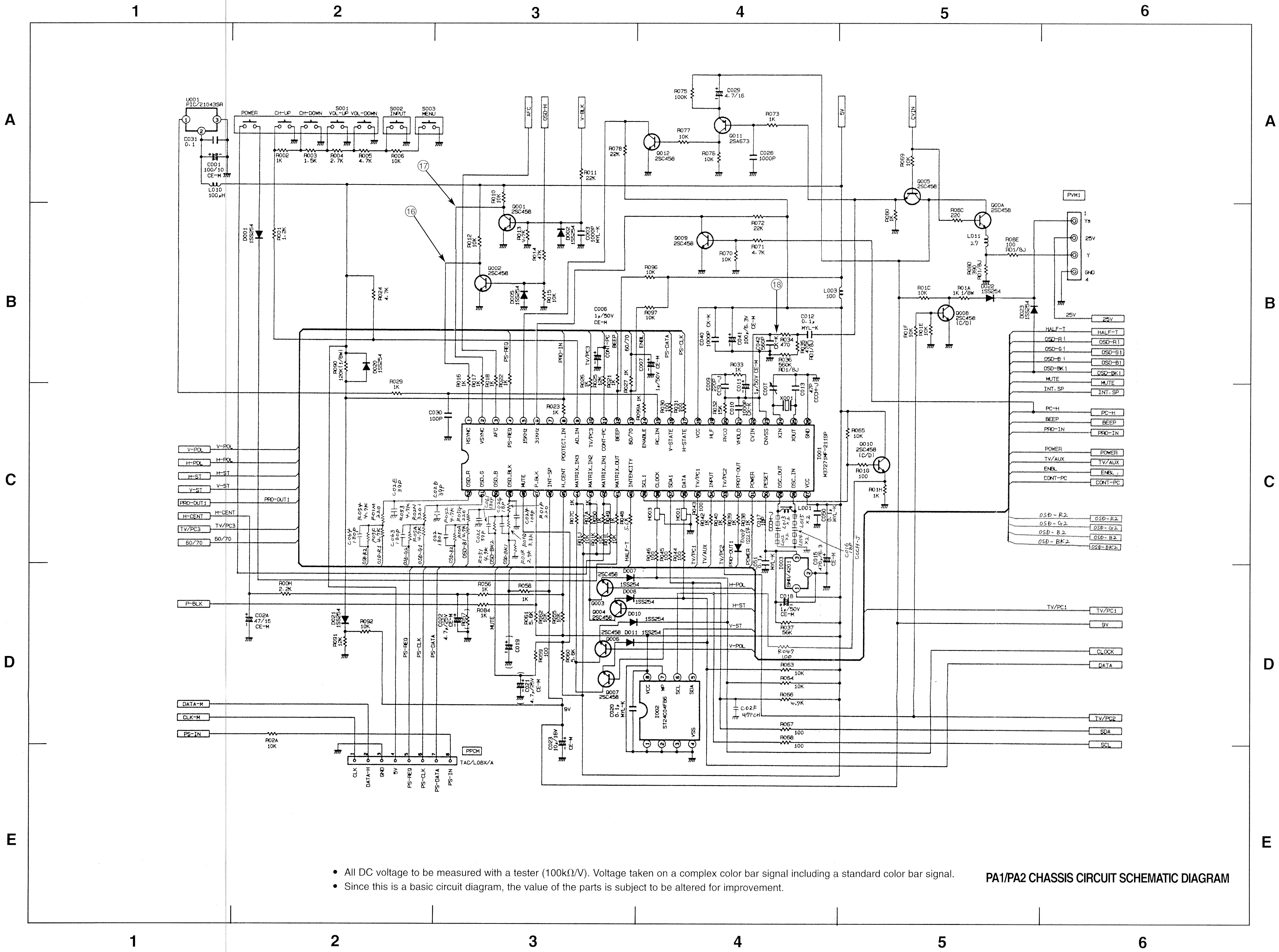
circuit no.	pin no.	DC voltage	
		TV mode	PC mode
I001	26	0v	0v
	27	4.98v	4.94v
	28	4.98v	3.17v
	29	4.98v	3.12v
	30	4.96v	4.92v
	31	4.96v	4.92v
	32	0v	0v
	33	4.91v	0v
	34	0v	0v
	35	0v	4.93v
	36	1.21v	1.2v
	37	4.54v	4.3v
	38	0v	0.1v
	39	4.16v	4.3v
	40	0v	0v
	41	0v	0v
	42	4.98v	4.94v
	43	4.98v	1.27v
	44	4.98v	1.28v
	45	0.86v	0.87v
	46	0v	0v
	47	0v	0v
	48	0v	0v
	49	0v	0v
	50	0v	0v
	51	0v	0v
	52	0v	0v

circuit no.	pin.no.	DC voltage
I 002		
	1	0v
	2	0v
	3	0v
	4	0v
	5	4.5v
	6	3.6v
	7	0v
	8	4.98v

circuit no.	pin no.	DC voltage
I 003	1	4.98v
	2	0v
	3	4.95v

circuit no.	pin no.	DC voltage
Q001	b	0v
	c	4.72v
	e	0v
circuit no.	pin no.	DC voltage
Q002	b	0v
	c	4.18v
	e	0v

circuit no.	pin no.	DC voltage	
		TV mode	PC mode
Q003	b	0v	1.61v
	c	4.98v	0.9v
	e	0v	0.9v
Q004	b	0.1v	1.58v
	c	4.98v	0.9v
	e	0v	0.9v


1
2
3
4
5
6
A
B
C
D
E
U001
PIC/21043SR
C031
0.1
C001
100/10
CE-M
L010
100μH
POWER
CH-UP
CH-DOWN
S001
VOL-UP
VOL-DOWN
S002
INPUT
S003
MENU
R002
1K
R003
1.5K
R004
2.7K
R005
4.7K
R006
10K
D001
1SS254
R001
1.2K
R024
4.7K
R090
120K(1/8W)
D020
1SS254
R029
1K
⑰
⑯
⑱
AFC
OSD-H
V-BLK
5V
CVIN
R011
22K
R010
10K
Q001
2SC458
R013
4.7K
D002
1SS254
C003
1000P
MYL-K
R012
10K
R014
47K
Q002
2SC458
D005
1SS254
R015
10K
R075
100K
C029
4.7/16
R077
10K
Q011
2SA673
R073
1K
R078
22K
Q012
2SC458
R076
10K
C026
1000P
Q009
2SC458
R072
22K
R071
4.7K
R070
10K
R096
10K
R097
10K
C006
1μ/50V
CE-M
L003
100
C040
1000P
CK-K
C041
100μ/6.3V
CE-M
C042
560P
CK-K
R034
470
R035
470K
R01/8J
R036
560K
R01/8J
C012
0.1μ
MYL-K
R033
1K
C009
220P
CCSL-J
C011
1μ/50V CE-M
R032
15K
C010
1000P
CK-K
C00T
X001
C013
47P
CCCH-J
R069
10K
Q005
2SC458
R080
1K
R08C
220
Q00A
2SC458
L011
27
R08E
100
R01/8J
R08D
390
R01/8J
D022
1SS254
R01C
10K
R01A
1K 1/8W
R01F
10K
R01E
10K
Q008
2SC458
(C/D)
D023
1SS254
PVM1
1
Ys
25V
Y
GND
4
HALF-T
OSD-R1
OSD-G1
OSD-B1
OSD-BK1
MUTE
INT.SP
PC-H
BEEP
PRO-IN
POWER
TV/AUX
ENBL
CONT-PC
OSD-R2
OSD-G2
OSD-B2
OSD-BK2
TV/PC1
9V
CLOCK
DATA
TV/PC2
SDA
SCL
R016
1K
R017
1K
R018
1K
R022
1K
PS-REQ
PRO-IN
TV/PC3
CONT-PC
BEEP
60/70
ENBL
PS-DATA
PS-CLK
R026
1K
R025
12K
R021
1K
R027 1K
C007
1μ/50V CE-M
R099A 1K
R030
100
R031
100
R023
1K
C030
100P
HSYNC
VSYNC
AFC
PS-REQ
15KHz
31KHz
POOTECT_IN
AD_IN
TV/PC3
CONT-PC
BEEP
60/70
ENABLE
RC_IN
V-STATE
H-STATE
VCC
HLF
RVCO
VHOLD
CVIN
CNVSS
XIN
XOUT
GND
I001
M37271MF-211SP
OSD_R
OSD_G
OSD_B
OSD_BLK
MUTE
P_BLK
INT-SP
H_CENT
MATRIX_IN3
MATRIX_IN2
MATRIX_IN1
MATRIX_OUT
INTENCITY
SCL1
CLOCK
SDA1
DATA
TV/PC1
INPUT
TV/PC2
PROT-OUT
POWER
PESET
OSC_OUT
OSC_IN
VCC
R065
10K
Q010
2SC458
(C/D)
R01G
100
R01H
1K
V-POL
H-POL
H-ST
V-ST
PRO-OUT1
H-CENT
TV/PC3
60/70
P-BLK
DATA-M
CLK-M
PS-IN
C02E
39P
C02D
39P
C064
180P
C063
180P
C062
180P
R054
4.7K
R053
4.7K
R052
4.7K
R01M
220
R02N
320
R05G
220
R05F
4.7K
R05A
4.7K
R00A
4.7K
C061
180P
C02G
18P
C02C
39P
C02Y
100P
R051
4.7K
R01P
220
R01Q
3.3K
R01R
2.7K
R07C 1K
R07A 1K
R050 1K
R049 1K
R048
5.6K
R01J
10K
R01K
10K
R01L
10K
HALF-T
H003
H001
R043 100
R042 1K
R040 1K
R039 1K
R038 1K
D009 1SS254
C017 18P
CCCH-J
L012
L013
L014
L015
L001
C050
0.1μ
MYL-K
C016
18P
CCCH-J
R046 100
R045 100
R044 100
TV/PC1
TV/AUX
TV/PC2
PRO-OUT1
POWER
C051
0.1μ
MYL-K
I003
BMR/4201
C015
470μ/6.3
CE-M
C018
1μ/50V
CE-M
R037
56K
R047
100
R00H
2.2K
C02A
47/16
CE-M
D021
1SS254
R092
10K
R091
12K
PS-REQ
PS-CLK
PS-DATA
C022
4.7μ/25V
CE-M
R057
R056
1K
R058
1K
R084
1K
MUTE
C019
R061
5.6K
R062
10K
R055
10K
R059
100
R060
5.6K
C021
4.7μ/25V
CE-M
9V
C023
10μ/16V
CE-M
2SC458
D007
1SS254
Q003
D008
1SS254
Q004
2SC458
D010
1SS254
2SC458
D011
1SS254
Q006
Q007
2SC458
H-POL
H-ST
V-ST
V-POL
C020
0.1μ
MYL-K
I002
ST24C04FB6
VCC
WP
SCL
SDA
VSS
R063
10K
R064
10K
R066
4.7K
C02F
47PCH
R067
100
R068
100
R02A
10K
PPCM
TAC/L08X/A
CLK
DATA-H
GND
5V
PS-REQ
PS-CLK
PS-DATA
PS-IN

- All DC voltage to be measured with a tester (100kΩ/V). Voltage taken on a complex color bar signal including a standard color bar signal.
- Since this is a basic circuit diagram, the value of the parts is subject to be altered for improvement.

PA1/PA2 CHASSIS CIRCUIT SCHEMATIC DIAGRAM

circuit no.	pin no.	DC voltage
Q005	b	2.17v
	c	9.21v
	e	1.52v

circuit no.	pin no.	DC voltage	
		TV mode	PC mode
Q006	b	0v	1.61v
	c	4.98v	0.9v
	e	0v	0.9v
Q007	b	0v	1.57v
	c	4.98v	0.9v
	e	0v	0.9v

circuit no.	pin no.	DC voltage	
Q008	b	0.66v	0v
	c	0v	9.21v
	e	0v	0v
Q009	b	0.1v	0.56v
	c	4.97v	0.38v
	e	0v	0v
Q010	b	*4.2v	*4.3v
	c	4.98v	4.94v
	e	*3.5v	*3.3v
Q011	b	1.54v	1v
	c	0.3v	0.6v
	e	1.69v	1.51v
Q012	b	0.1v	0.45v
	c	3.72v	1.95v
	e	0v	0v
Q00A	b	1.8v(TV)	
	c	9.2v(TV)	
	e	1.6v(TV)	

BASIC CIRCUIT DIAGRAM

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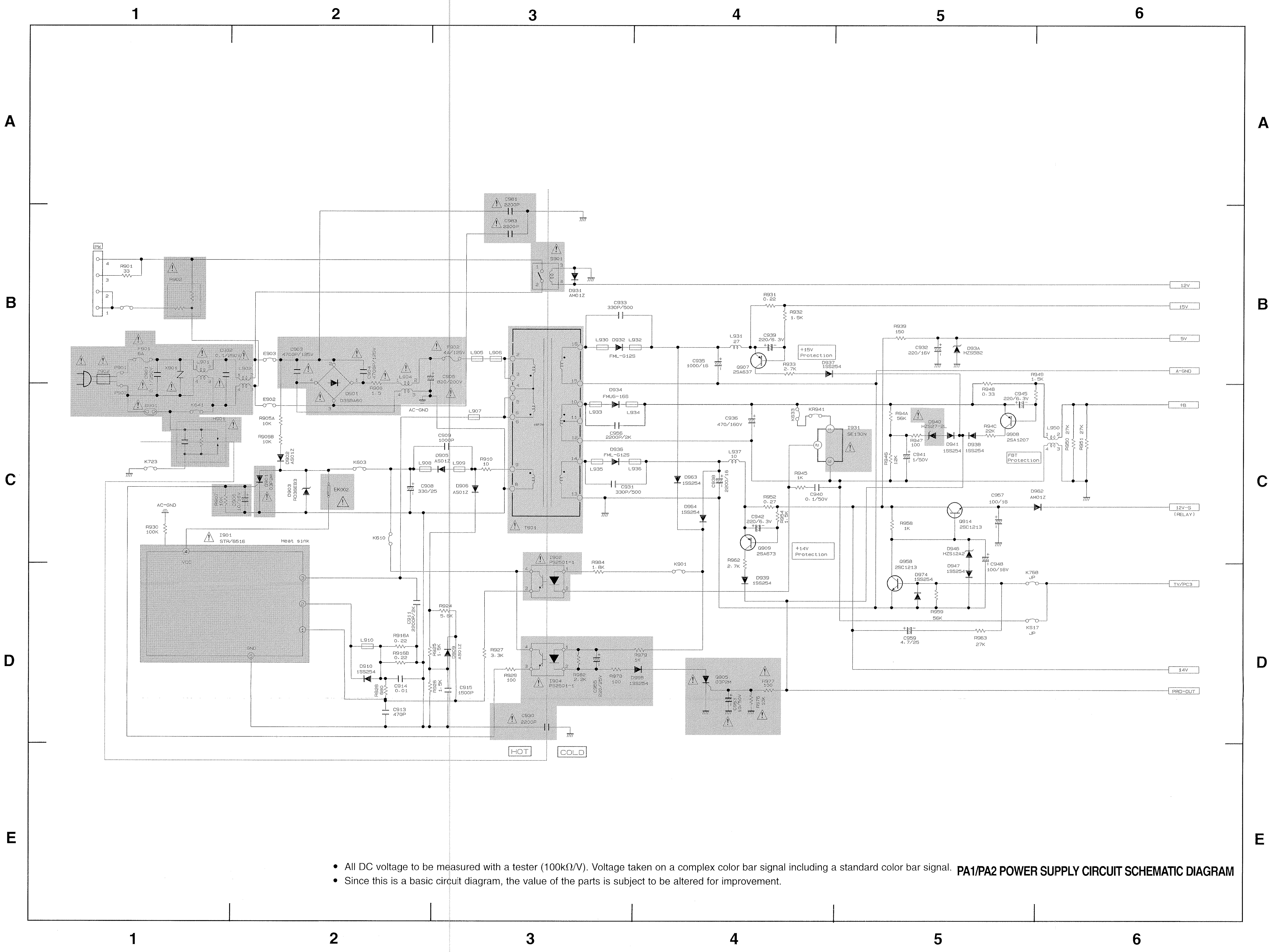
1
2
3
4
5
6
A
B
C
D
E
12V
15V
5V
A-GND
+B
12V-S (RELAY)
TV/PC3
14V
PRO-OUT
T901
I901 STR/6516
Heat sink
VCC
GND
I902 PS2501-1
I904 PS2501-1
I931 SE130N
Q907 2SA637
Q908 2SA1207
Q909 2SA673
Q914 2SC1213
Q958 2SC1213
D901 D3SBA60
+15V Protection
+14V Protection
FBT Protection
AC-GND
HOT
COLD

- All DC voltage to be measured with a tester (100kΩ/V). Voltage taken on a complex color bar signal including a standard color bar signal.
- Since this is a basic circuit diagram, the value of the parts is subject to be altered for improvement.

PA1/PA2 POWER SUPPLY CIRCUIT SCHEMATIC DIAGRAM

circuit no.	pin no.	DC voltage
I 901 (HOT)	1	1.7v
	2	0v
	3	160v
	4	17.8v
	5	0v

circuit no.	pin no.	DC voltage
I 902 (COLD)	1	13.71v
	2	12.73v
I 902 (HOT)	3	3v
	4	17.8v

I 904 (COLD)	1	14.50v
	2	14.50v
I 904 (HOT)	3	0v
	4	17.8v

circuit no.	pin no.	DC voltage
I 931	1	129v
	2	12.6v
	3	0v

circuit no.	pin no.	DC voltage
Q 907	b	14.8v
	c	0v
	e	14.8v
Q 908	b	128.8v
	c	0v
	e	129.17v
Q 909	b	13.5v
	c	0v
	e	13.80v
Q 914	b	12.7v
	c	13.51v
	e	12v
Q958	b	0v
	c	12.7v
	e	0v

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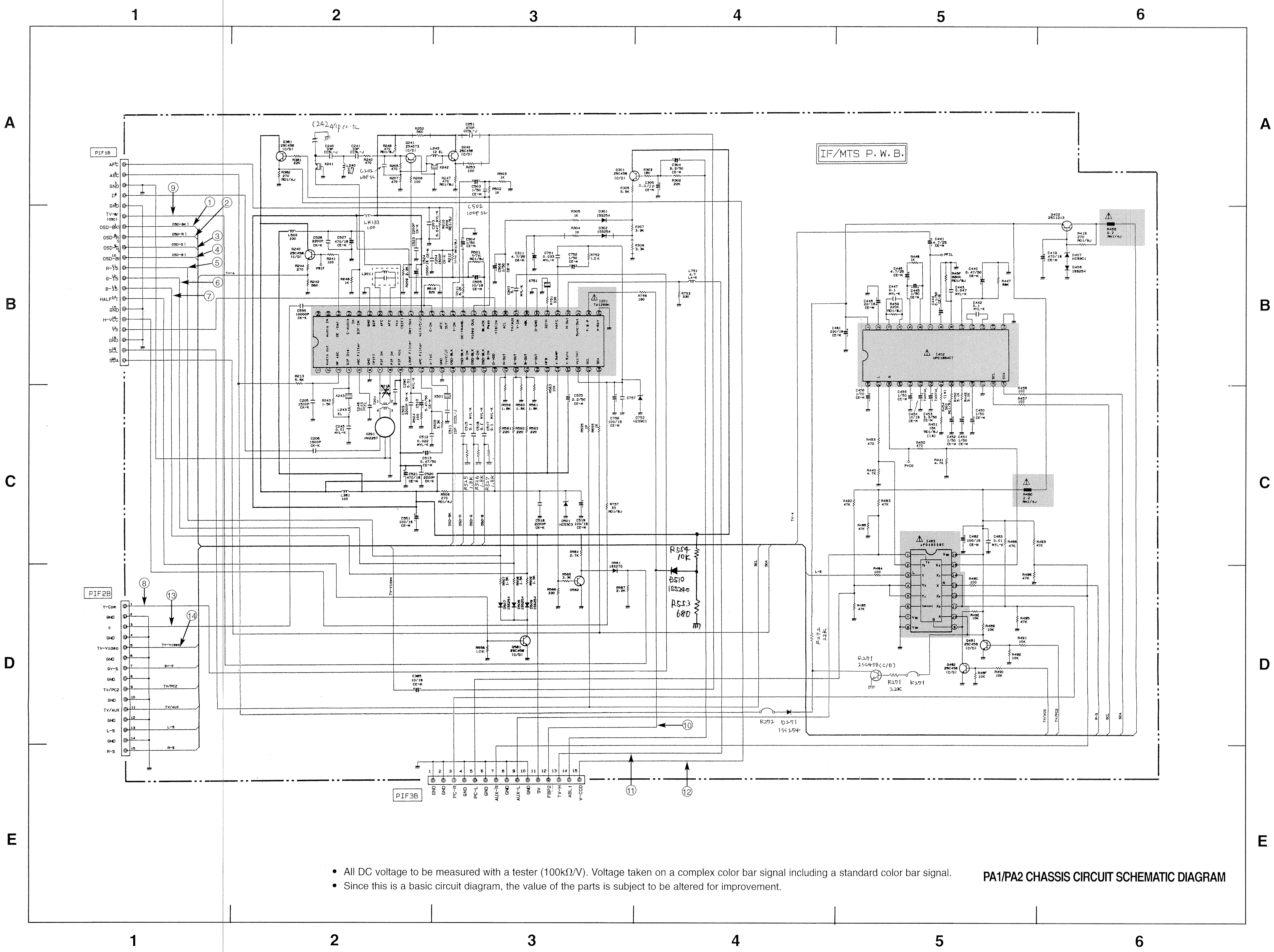
BASIC CIRCUIT DIAGRAM

circuit no.	pin no.	DC voltage
I201	1	0v
	2	4v
	3	7.2v
	4	3.3v
	5	4.3v
	6	0v
	7	2v
	8	2v
	9	9.2v
	10	4.6v
	11	6.3v
	12	4.8v
	13	0v
	14	0v
	15	4.8v
	16	4.8v
	17	4.7v
	18	3.7v
	19	2.7v
	20	2.8v
	21	2.9v
	22	4v
	23	8.7v
	24	0v
	25	7.14v
	26	9.7v
	27	3.6v
	28	4.5v

circuit no.	pin no.	DC voltage
I201	29	0v
	30	1.5v
	31	0v
	32	1.1v
	33	8.2v
	34	6.7v
	35	0v
	36	3.3v
	37	3.2v
	38	3.3v
	39	1.5v
	40	5.3v
	41	2.9v
	42	4.7v
	43	4.7v
	44	2.7v
	45	2.7v
	46	9.1v
	47	3.9v
	48	9.2v
	49	8.2v
	50	8.2v
	51	0v
	52	0v
	53	2.9v
	54	4v
	55	2.9v
	56	0v

circuit no.	pin no.	DC voltage
I402	1	9.23v
	2	4.64v
	3	4.58v
	4	4.59v
	5	4.61v
	6	4.61v
	7	4.56v
	8	4.42v
	9	4.54v
	10	0v
	11	3.36v
	12	4.57v
	13	4.61v
	14	0v
	15	4.35v
	16	3.72v
	17	0v
	18	4.42v
	19	4.76v
	20	4.59v
	21	1.27v
	22	5.15v
	23	5.1v
	24	4.58v
	25	4.64v
	26	4.64v
	27	4.64v
	28	3.82v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A
B
C
D
E
IF/MTS P.W.B.
PIF1B
AFC
AGC
GND
IF
GND
TV-9V (OSC)
OSD-BK1
OSD-R1
OSD-G1
OSD-B1
R-15
G-15
B-15
HALF-T
GND
H-VCC
YS
GND
SCL
SDA
OSD-BK1
OSD-R1
OSD-G1
OSD-B1
TV-A
①
②
③
④
⑤
⑥
⑦
⑧
⑨
⑩
⑪
⑫
⑬
⑭
PIF2B
Y-Com
GND
C
GND
TV-Video
GND
9V-S
GND
TV/PC2
GND
TV/AUX
GND
L-S
GND
R-S
TV-Video
9V-S
TV/PC2
TV/AUX
L-S
R-S
PIF3B
GND
GND
PC-R
GND
PC-L
GND
AUX-R
GND
AUX-L
GND
9V
FBP2
TV-H
ABL1
V-CCD
I201
TA1288N
I402
UPC1864CT
I483
R554
10K
D510
1SS240
R553
680
R272
22K
Q271
2SC458(C/D)
R271
22K
K272
D271
1SS254
SCL
SDA

- All DC voltage to be measured with a tester (100kΩ/V). Voltage taken on a complex color bar signal including a standard color bar signal.
- Since this is a basic circuit diagram, the value of the parts is subject to be altered for improvement.

PA1/PA2 CHASSIS CIRCUIT SCHEMATIC DIAGRAM

ciruit no.	pin no.	DC voltage
I483	1	4.60v
	2	4.22v
	3	4.22v
	4	4.59v
	5	4.59v
	6	0v
	7	0v
	8	27.98v
	9	9.22v
	10	0v
	11	4.65v
	12	4.61v
	13	4.23v
	14	4.65v
	15	4.23v
	16	9.23v

circuit no.	pin no.	DC voltage
Q240	b	3.97V
	c	0V
	e	4.59V
Q241	b	3.97V
	c	0V
	e	4.59V
Q242	b	2.30V
	c	9.17V
	e	1.63V

circuit no.	pin no.	DC voltage	
		TV mode	PC mode
Q271	b	0v	0.6v
	c	9.2v	0v
	e	0v	0v
Q301	b	9.7v(TV)	
	c	9.1v(TV)	
	e	9.0v(TV)	
Q381	b	2.5v(TV)	
	c	9.2v(TV)	
	e	1.8v(TV)	
Q402	b	9.92V(TV)	
	c	12.11V(TV)	
	e	9.23V(TV)	
		TV mode	PC mode
Q481	b	0V	0.6v
	c	0.6v	0v
	e	0V	0v

ciruit no.	pin no.	DC voltage	
		TV mode	AUX
Q482	b	0V	0.7v
	c	9.22V	0v
	e	0V	0v
Q581	b	0V	
	c	4.38V	
	e	0V	
Q582	b	1.8v	0v
	c	9.2v	4.2v
	e	1.6v	0v

BASIC CIRCUIT DIAGRAM

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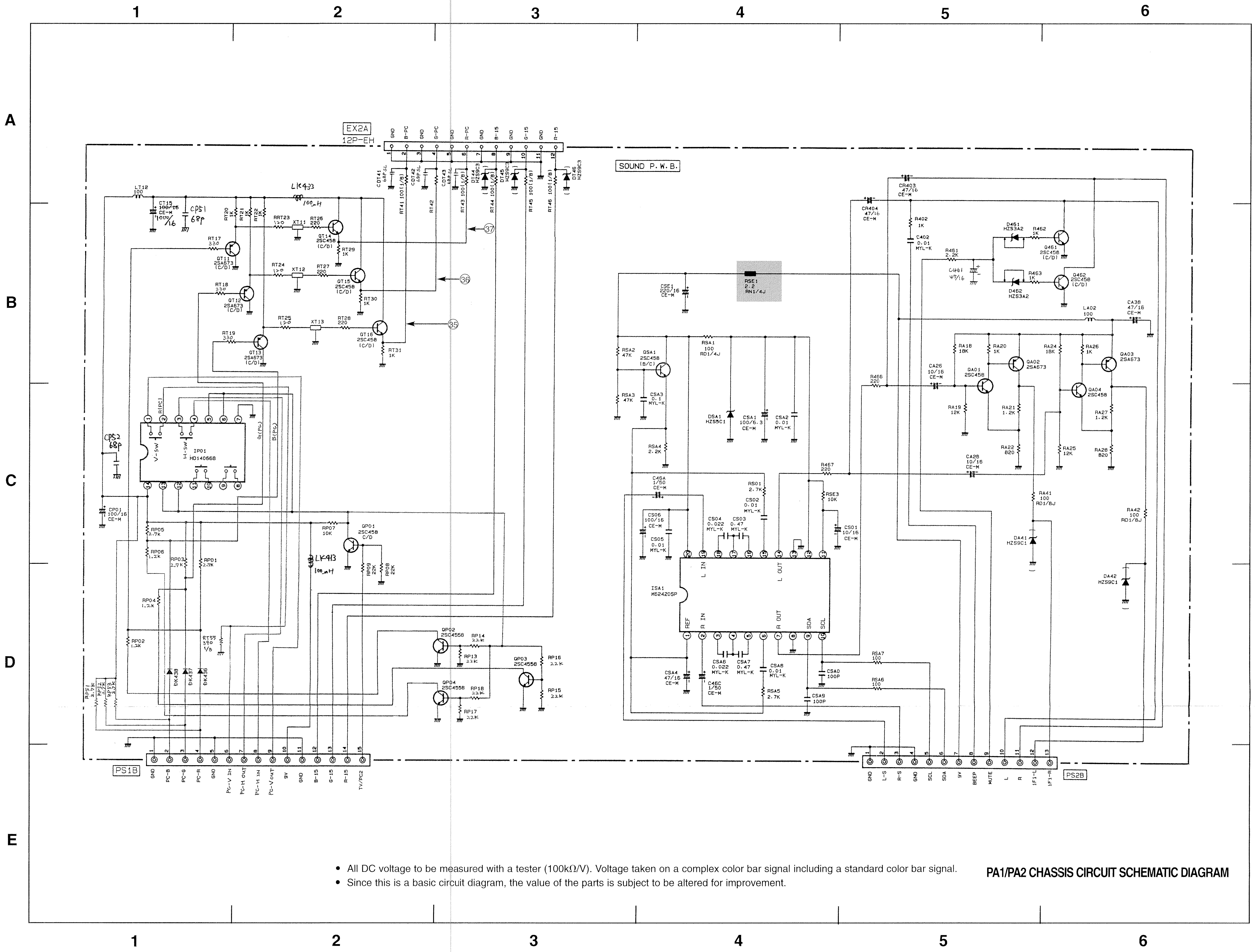
1
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A
B
C
D
E
EX2A
12P-EH
GND
B-PC
GND
G-PC
GND
R-PC
GND
B-15
GND
G-15
GND
R-15
SOUND P.W.B.
LT12 100
CT15
CP51 68p
LK433
RT17 330
QT11 2SA673 (C/D)
RT18 330
QT12 2SA673 (C/D)
RT19 330
QT13 2SA673 (C/D)
RRT23
XT11
RT26 220
QT14 2SC458 (C/D)
RT29 1K
RT24
XT12
RT27 220
QT15 2SC458 (C/D)
RT30 1K
RT25
XT13
RT28 220
QT16 2SC458 (C/D)
RT31 1K
37
36
35
CDT41 68P
CDT42 68P
CDT43 68P
DT44 HZS9C3
DT45 HZS9C3
DT46 HZS9C3
RT41
RT42
RT43
RT44
RT45
RT46
IP01 HD14066B
V-SW
H-SW
CP52 68p
CP01 100/16 CE-M
RP05 2.7K
RP06 1.2K
RP03 2.7K
RP01 2.7K
RP04 1.2K
RP02 1.2K
RP07 10K
QP01 2SC458 C/D
LK413
RP09 22K
RP08 22K
RT55
DK438
DK437
DK436
QP02 2SC4558
RP14 22K
RP13 22K
QP03 2SC4558
RP16 22K
RP15 22K
QP04 2SC4558
RP18 22K
RP17 22K
PS1B
GND
PC-B
PC-G
PC-R
GND
PC-V IN
PC-H OUT
PC-H IN
PC-V OUT
9V
GND
B-15
G-15
R-15
TV/PC2
CSE1 220/16 CE-M
RSE1 2.2 RN1/4J
RSA2 47K
QSA1 2SC458 (B/C)
RSA3 47K
CSA3 0.1 MYL-K
RSA1 100 RD1/4J
DSA1 HZS5C1
CSA1 100/6.3 CE-M
CSA2 0.01 MYL-K
RSA4 2.2K
C464 1/50
CS06 100/16 CE-M
CS05 0.01 MYL-K
CS04 0.022 MYL-K
CS03 0.47 MYL-K
RS01 2.7K
CS02 0.01 MYL-K
RSE3 10K
CS01 10/16 CE-M
ISA1 M62420SP
L IN
L OUT
REF
R IN
R OUT
SDA
SCL
CSA4 47/16 CE-M
CSA6 0.022 MYL-K
CSA7 0.47 MYL-K
C46C 1/50 CE-M
CSA8 0.01 MYL-K
RSA5 2.7K
CSA0 100P
CSA9 100P
RSA7 100
RSA6 100
R467 220
R466 220
CR404 47/16 CE-M
CR403 47/16 CE-M
R402 1K
C402 0.01 MYL-K
R461 2.2K
C461 47/16
D461 HZS3A2
R462 1K
Q461 2SC458 (C/D)
D462 HZS3A2
R463 1K
Q462 2SC458 (C/D)
LA02 100
CA38 47/16 CE-M
CA26 10/16 CE-M
RA18 18K
RA20 1K
QA01 2SC458
QA02 2SA673
RA24 18K
RA26 1K
QA03 2SA673
QA04 2SC458
RA19 12K
RA21 1.2K
RA27 1.2K
CA28 10/16 CE-M
RA22 820
RA25 12K
RA28 820
RA41 100 RD1/8J
DA41 HZS9C1
RA42 100 RD1/8J
DA42 HZS9C1
PS2B
GND
L-S
R-S
GND
SCL
SDA
9V
BEEP
MUTE
L
R
IF1-L
IF1-R

- All DC voltage to be measured with a tester (100kΩ/V). Voltage taken on a complex color bar signal including a standard color bar signal.
- Since this is a basic circuit diagram, the value of the parts is subject to be altered for improvement.

PA1/PA2 CHASSIS CIRCUIT SCHEMATIC DIAGRAM

circuit no.	pin no.	DC voltage
ISA1	1	3.86V
	2	3.82V
	3	3.81V
	4	3.86V
	5	3.85V
	6	3.85V
	7	3.85V
	8	0V
	9	4.37V
	10	3.72V
	11	5.27V
	12	5.27V
	13	0V
	14	3.83V
	15	3.38V
	16	3.38V
	17	3.84V
	18	3.79V
	19	3.81V
	20	9.18V

circuit no.	pin no.	DC voltage
		PC mode
IP01	1	1.7v
	2	1.7v
	3	1.4v
	4	1.4v
	5	4.8v
	6	4.8v
	7	0v
	8	**N/C**
	9	**N/C**
	10	**N/C**
	11	**N/C**
	12	4.8v
	13	4.8v
	14	9.24V

circuit no.	pin no.	DC voltage	
		TV mode	PC mode
QT11	b	9.22V	4.0v
	c	0V	0v
	e	9.1V	4.6v
QT12	b	9.22V	4.1v
	c	0V	0v
	e	9.1V	4.8v
QT13	b	9.22V	4.1v
	c	0V	0v
	e	9.1V	4.8v
QT14	b	9.1V	4.6v
	c	9.12V	9.0v
	e	8.34V	4.0v
QT15	b	9.1V	4.8v
	c	9.12V	9.0v
	e	8.34V	4.1v
QT16	b	9.1V	4.8v
	c	9.11V	8.9v
	e	8.36V	4.1v
QP01	b	0.6V	0v
	c	0V	5.0v
	e	0V	0v
QP02	b	0V	0.7v
	c	9.21V	0v
	e	0V	0v
QP03	b	0V	0.7v
	c	9.22V	0v
	e	0V	0v
QP04	b	0V	0.7v
	c	9.20V	0v
	e	0V	0v

circuit no.	pin no.	DC voltage
Q461	b	0V
	c	0V
	e	0V
Q462	b	0V
	c	0V
	e	0V
QSA1	b	4.48V
	c	9.17V
	e	3.84V
QA01	b	3.72V
	c	8.67V
	e	3.10V
QA02	b	8.67V
	c	6.80V
	e	9.28V
QA03	b	8.66V
	c	6.7V
	e	9.28V
QA04	b	3.75V
	c	8.67V
	e	3.12V

BASIC CIRCUIT DIAGRAM

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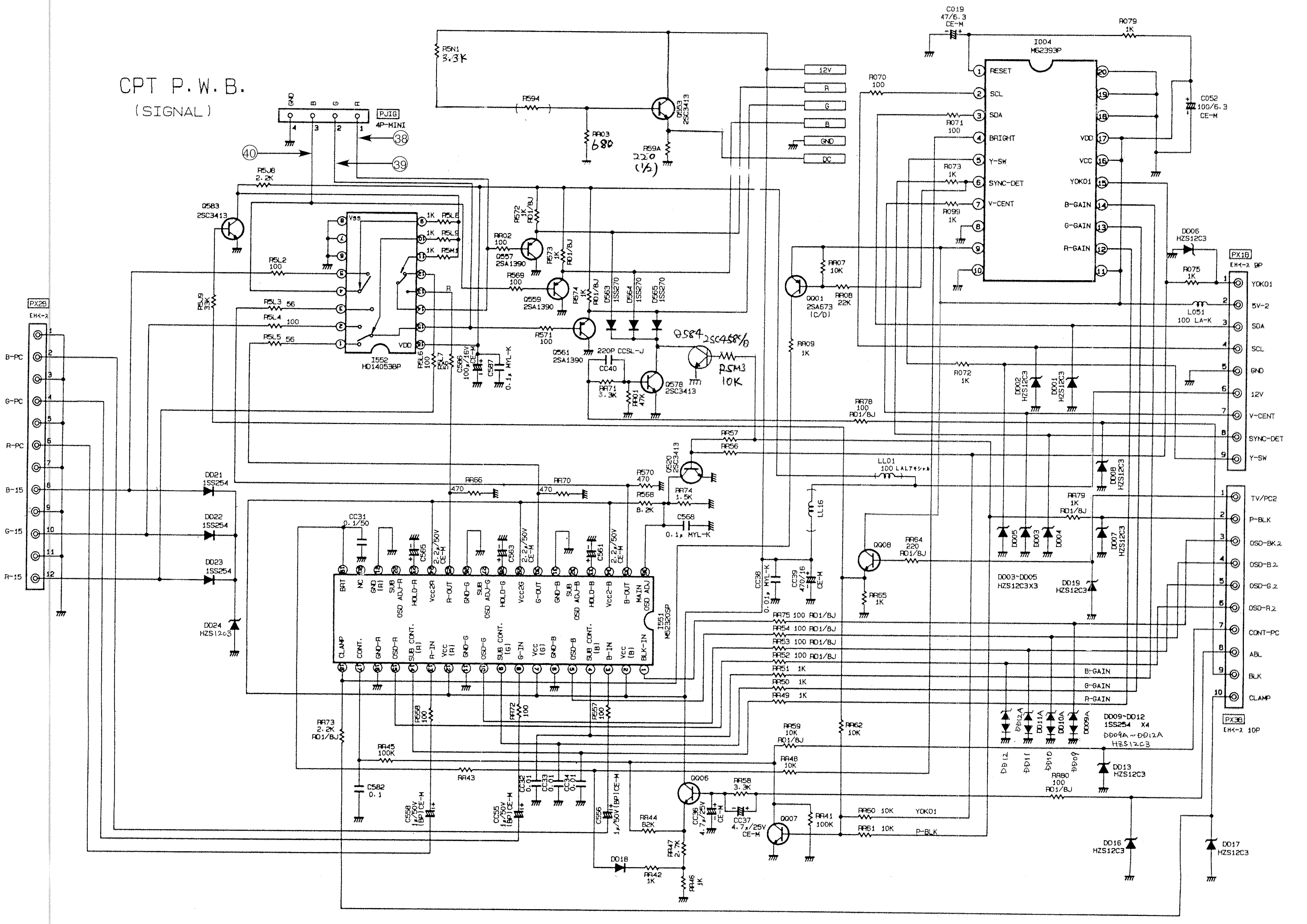
circuit no.	pin no.	DC voltage / PC Mode
I551		
	1	0v
	2	11.9v
	3	2.8v
	4	2.82v
	5	0v
	6	0v
	7	11.96v
	8	2.79v
	9	2.92v
	10	0v
	11	0v
	12	11.91v
	13	2.8v
	14	2.94v
	15	0v
	16	0v
	17	2.66v
	18	0.3v
	19	2.48v
	20	0v
	21	0v
	22	5.46v
	23	4.37v
	24	11.93v
	25	3.06v
	26	0v
	27	5.46v
	28	4.38v
	29	11.93v
	30	3.05v
	31	0v
	32	5.46v
	33	0v
	34	11.93v
	35	3.04v
	36	1.96v

circuit no.	pin no.	DC voltage	
		TV mode	PC mode
I552	1	3.4v	3.1v
	2	2.7v	1.9v
	3	3.4v	3.1v
	4	2.3v	3.2v
	5	2.3v	1.6v
	6	0v	0v
	7	0v	0v
	8	0v	0v
	9	0v	11.9v
	10	0v	11.9v
	11	0v	11.9v
	12	2.7v	1.8v
	13	3.4v	3.0v
	14	2.7v	3.0v
	15	2.7v	3.0v
	16	11.9v	11.9v

circuit no.	pin no.	DC voltage
I004	1	5.45v
	2	3.68v
	3	4.35v
	4	2.30v
	5	0v
	6	0v(TV) 5.4v(PC)
	7	2.24v
	8	0v
	9	5.45v
	10	0v
	11	5.45v
	12	2.9v
	13	2.9v
	14	2.8v
	15	0v
	16	5.45v
	17	5.45v
	18	0v
	19	0v
	20	0v


1
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A
B
C
D
E
CPT P.W.B.
(SIGNAL)
PJIG
4P-MINI
GND
B
G
R
38
39
40
R5J8 2.2K
Q583 2SC3413
R5J9 33K
R5L2 100
R5L3 56
R5L4 100
R5L5 56
I552 HD14053BP
Vss
VDD
R5L6 100
R5L7
C586 100μ/16V CE-M
C587 0.1μ MYL-K
R5N1 3.3K
R594
RR03 680
R59A 220 (1/2)
Q553 2SC3413
12V
R
G
B
GND
DC
RR02 100
Q557 2SA1390
R572
R573
R569 100
Q559 2SA1390
Q561 2SA1390
R571 100
Q578 2SC3413
Q584 2SC458
R5M3 10K
CC40 220P
RR71 3.3K
QQ01 2SA673 (C/D)
RR07 10K
RR08 22K
RR09 1K
PX28
EH<-x
B-PC
G-PC
R-PC
B-15
G-15
R-15
DD21 1SS254
DD22 1SS254
DD23 1SS254
DD24 HZS12C3
RR66
RR70
R570 470
R568 8.2K
Q520 2SC3413
RR57
RR56
RR74 1.5K
C568 0.1μ MYL-K
I551 M52325SP
CC31 0.1/50
C582 0.1
RR73 2.2K RD1/8J
RR45 100K
RR43
QQ06
QQ07
RR58 3.3K
CC37 4.7μ/25V CE-M
RR44 82K
RR41 100K
RR47
RR46 1K
RR42 1K
DD18
RR60 10K YOKO1
RR61 10K P-BLK
LL01 100 LAL7+5vh
LL16
QQ08
RR64 220 RD1/8J
RR65 1K
RR75 100 RD1/8J
RR54 100 RD1/8J
RR53 100 RD1/8J
RR52 100 RD1/8J
RR51 1K
RR50 1K
RR49 1K
B-GAIN
G-GAIN
R-GAIN
RR59 10K RD1/8J
RR62 10K
RR48 10K
C019 47/6.3 CE-M
R079 1K
I004 M62393P
RESET
SCL
SDA
BRIGHT
Y-SW
SYNC-DET
V-CENT
VDD
VCC
YOKO1
B-GAIN
G-GAIN
R-GAIN
R070 100
R071 100
R073 1K
R099 1K
C052 100/6.3 CE-M
R072 1K
RR78 100 RD1/8J
DD02 HZS12C3
DD01 HZS12C3
DD06 HZS12C3
R075 1K
L051 100 LA-K
PX18
EH<-x 9P
YOKO1
5V-2
SDA
SCL
GND
12V
V-CENT
SYNC-DET
Y-SW
DD08 HZS12C3
RR79 1K RD1/8J
DD03
DD04
DD05
DD07 HZS12C3
DD03~DD05 HZS12C3X3
DD19 HZS12C3
TV/PC2
P-BLK
OSD-BK2
OSD-B2
OSD-G2
OSD-R2
CONT-PC
ABL
BLK
CLAMP
PX38
EH<-x 10P
DD09A
DD10A
DD11A
DD09
DD10
DD11
DD12
DD09~DD12 1SS254 X4
DD09A~DD12A HZS12C3
DD13 HZS12C3
RR80 100 RD1/8J
DD16 HZS12C3
DD17 HZS12C3

- All DC voltage to be measured with a tester (100kΩ/V). Voltage taken on a complex color bar signal including a standard color bar signal.
- Since this is a basic circuit diagram, the value of the parts is subject to be altered for improvement.

PA1/PA2 CHASSIS CIRCUIT SCHEMATIC DIAGRAM

circuit no.	pin no.	DC voltage	
		TV mode	PC mode
QQ01	b	4.81v	5.43
	c	5.4v	0.3
	e	5.4v	5.44
QQ06	b	7.13v	9.83
	c	11.91v	11.95
	e	6.47v	9.16
QQ07	b	0.66v	0
	c	0v	2.87
	e	0v	0
QQO8	b	4.03v	0
	c	5.44v	5.44
	e	3.38v	0
Q520	b	0v	0
	c	1.96v	1.96
	e	0v	0
Q583	b	0.7v	0
	c	0v	11.95
	e	0v	0

circuit no.	pin no.	DC voltage	
		TV mode	PC mode
Q553	b	2v	2v
	c	11.9v	11.95v
	e	1.35v	1.36v
Q561	b	2.63v	3
	c	0v	0v
	e	3.26v	3.34v
Q557	b	2.56v	3v
	c	0v	0v
	e	3.2v	3.34v
Q559	b	2.56v	3
	c	0v	0v
	e	3.32v	3.32v
Q578	b	0v	0v
	c	3.42v	3
	e	0v	0v
Q584	b	0v	0v
	c	3.4v	3
	e	0v	0v

BASIC CIRCUIT DIAGRAM

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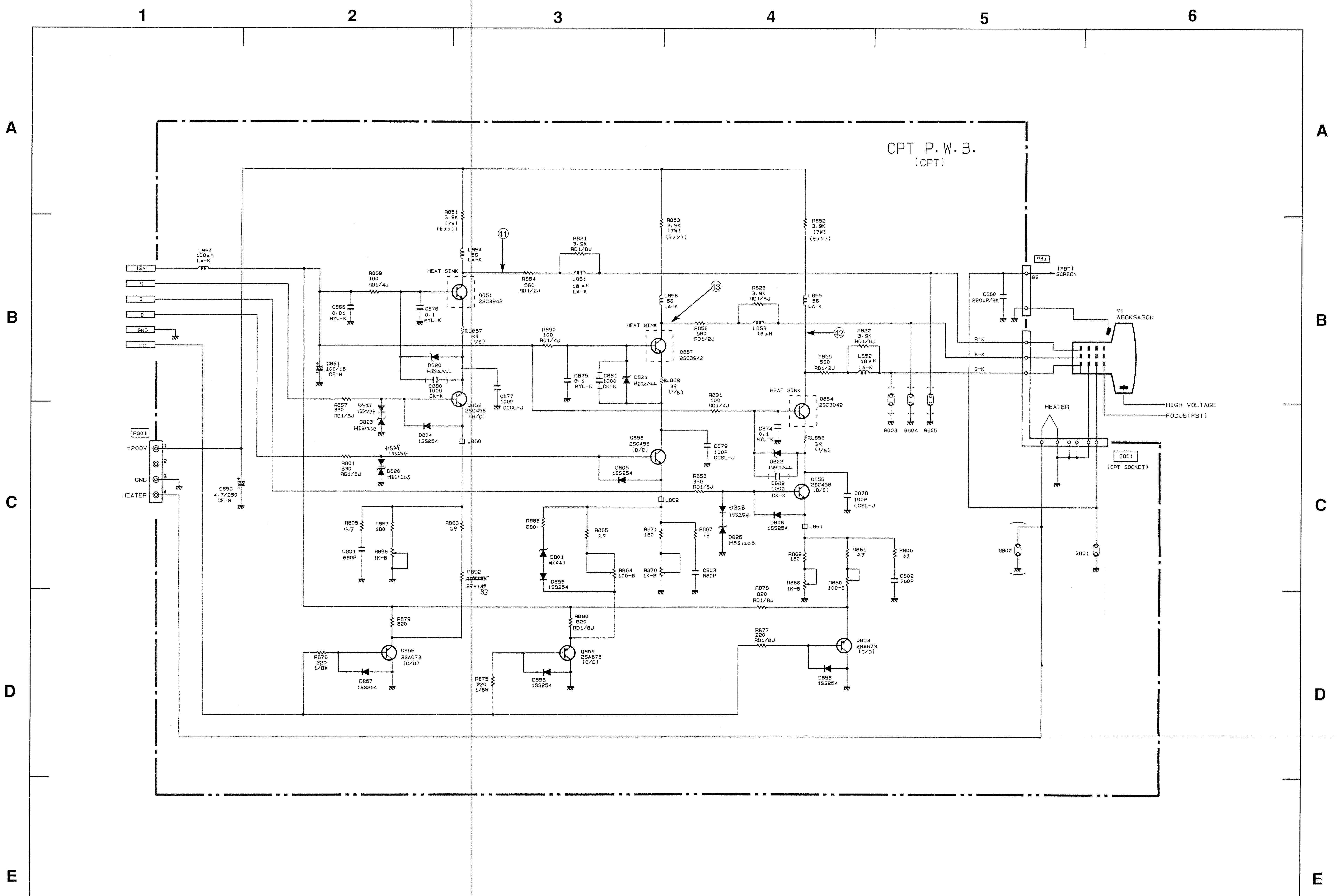
1
2
3
4
5
6
A
B
C
D
E
CPT P.W.B.
(CPT)
12V
R
G
B
GND
DC
L854 100μH LA-K
P801
+200V
GND
HEATER
C859 4.7/250 CE-M
C851 100/16 CE-M
C866 0.01 MYL-K
R889 100 RD1/4J
C876 0.1 MYL-K
R851 3.9K (7W) (セメント)
L854 56 LA-K
HEAT SINK
Q851 2SC3942
RL857 39 (1/8)
D820 HZS2ALL
C880 1000 CK-K
C877 100P CCSL-J
R857 330 RD1/8J
D827 1SS254
D823 HZS12C3
Q852 2SC458 (B/C)
D804 1SS254
L860
D829 1SS254
R801 330 RD1/8J
D826 HZS12C3
41
R854 560 RD1/2J
R821 3.9K RD1/8J
L851 18μH LA-K
R890 100 RD1/4J
C875 0.1 MYL-K
C881 1000 CK-K
D821 HZS2ALL
R853 3.9K (7W) (セメント)
L856 56 LA-K
43
Q857 2SC3942
RL859 39 (1/8)
R856 560 RD1/2J
R823 3.9K RD1/8J
L853 18μH
R852 3.9K (7W) (セメント)
L855 56 LA-K
42
R822 3.9K RD1/8J
R855 560 RD1/2J
L852 18μH LA-K
R891 100 RD1/4J
Q854 2SC3942
C874 0.1 MYL-K
RL858 39 (1/8)
D822 HZS2ALL
C882 1000 CK-K
Q855 2SC458 (B/C)
C878 100P CCSL-J
Q858 2SC458 (B/C)
C879 100P CCSL-J
D805 1SS254
R858 330 RD1/8J
L862
D828 1SS254
D825 HZS12C3
D806 1SS254
L861
R805 4.7
C801 680P
R867 180
R866 1K-B
R863 39
R892 ~~20V188~~ 27V·~~47~~ 33
R886 680
D801 HZ4A1
D855 1SS254
R865 27
R864 100-B
R871 180
R870 1K-B
R807 15
C803 680P
R869 180
R868 1K-B
R861 27
R860 100-B
R806 33
C802 560P
R878 820 RD1/8J
R879 820
Q856 2SA673 (C/D)
R876 220 1/8W
D857 1SS254
R880 820 RD1/8J
Q859 2SA673 (C/D)
R875 220 1/8W
D858 1SS254
R877 220 RD1/8J
Q853 2SA673 (C/D)
D856 1SS254
G803
G804
G805
C860 2200P/2K
P31
G2
(FBT) SCREEN
R-K
B-K
G-K
V1 A68KSA30K
HIGH VOLTAGE
FOCUS(FBT)
HEATER
E851
(CPT SOCKET)
G802
G801

circuit no.	pin no.	DC voltage	
		TV mode	PC mode
Q851	b	11.79v	11.84v
	c	157.7v	140v
	e	11.26v	11.3v
Q857	b	11.79v	11.83v
	c	152.2v	141.8v
	e	11.25v	11.29v
Q854	b	11.79v	11.84v
	c	159v	146v
	e	11.25v	11.29v
Q852	b	3.26v	3.4v
	c	10.73v	10.71v
	e	2.87v	3v
Q858	b	3.36v	3.36v
	c	10.66v	10.71v
	e	2.96v	2.93v
Q855	b	3.32v	3.4v
	c	10.74v	10.77v
	e	2.92v	2.96v
Q856	b	1.41v	1.41v
	c	0v	0v
	e	2v	2v
Q859	b	1.41v	1.41v
	c	0v	0v
	e	2v	2v
Q853	b	1.4v	1.41v
	c	0v	0v
	e	2v	2v

- All DC voltage to be measured with a tester (100kΩ/V). Voltage taken on a complex color bar signal including a standard color bar signal.
- Since this is a basic circuit diagram, the value of the parts is subject to be altered for improvement.

PA1/PA2 CHASSIS CIRCUIT SCHEMATIC DIAGRAM

1 2 3 4 5 6

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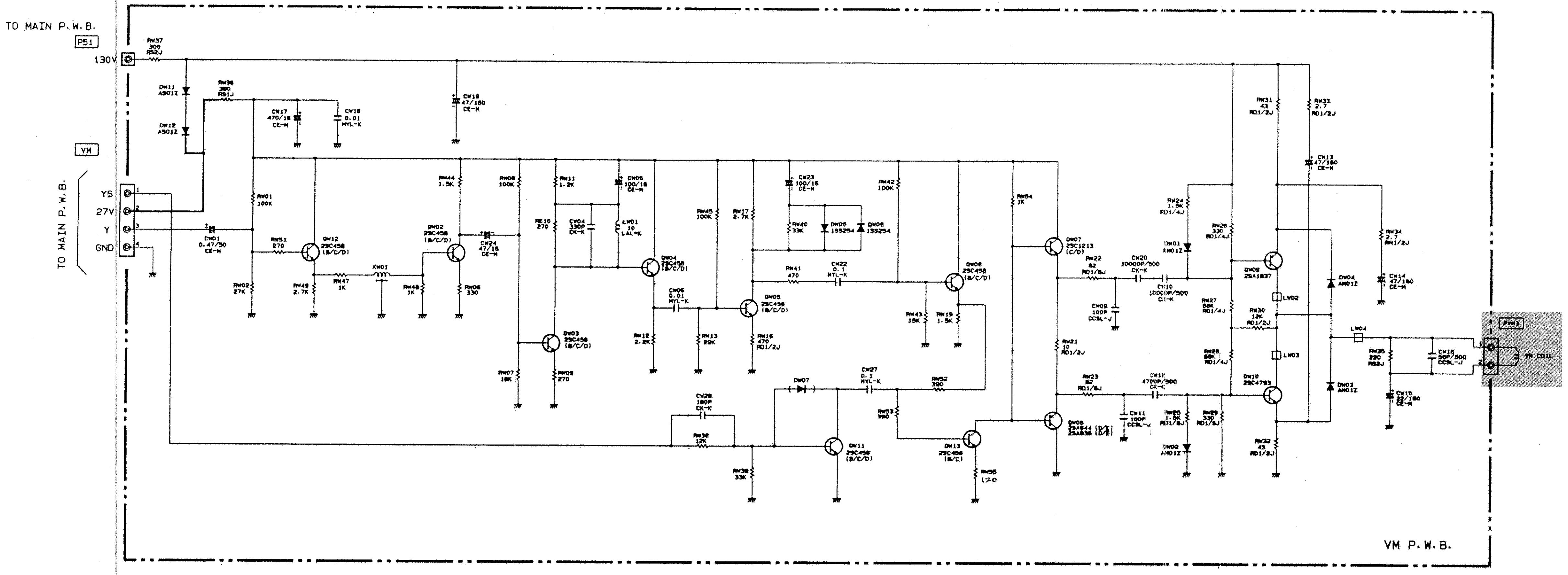
BASIC CIRCUIT DIAGRAM

circuit no.	pin no.	DC voltage
QW02	b	1.12v
	c	12.35v
	e	0.48v
QW03	b	1.92v
	c	8.85v
	e	1.28v
QW04	b	8.84v
	c	14.52v
	e	8.16v
QW05	b	2.23v
	c	5.16v
	e	1.65v
QW06	b	1.84v
	c	9.61v
	e	1.20v
QW07	b	9.60v
	c	14.54v
	e	9.64v
QWO8	b	9.61v
	c	0v
	e	9.64v
QW09	b	127.50v
	c	60.68v
	e	127.77v
QW10	b	0.30v
	c	60.75v
	e	0v
QW11	b	0v
	c	0v
	e	0v
QW12	b	2.90v
	c	14.53v
	e	2.25v
QW13	b	1.18v
	c	9.61v
	e	0.50v



TO MAIN P.W.B.
P51
130V
VM
TO MAIN P.W.B.
YS
27V
Y
GND
RW37 300 RS2J
DW11 AS01Z
DW12 AS01Z
RW36 300 RS1J
CW17 470/16 CE-M
CW18 0.01 MYL-K
CW19 47/160 CE-M
CW01 0.47/50 CE-M
RW01 100K
RW02 27K
RW51 270
RW49 2.7K
QW12 2SC458 (B/C/D)
RW47 1K
XW01
RW48 1K
QW02 2SC458 (B/C/D)
CW24 47/16 CE-M
RW44 1.5K
RW06 330
RW08 100K
RE10 270
RW07 18K
RW31 43 RD1/2J
RW33 2.7 RD1/2J
CW13 47/160 CE-M
RW26 330 RD1/4J
QW09 2SA1837
DW04 AM01Z
RW34 2.7 RN1/2J
CW14 47/160 CE-M
LW02
RW27 68K RD1/4J
RW30 12K RD1/2J
LW04
LW03
RW35 220 RS2J
CW16 56P/500 CCSL-J
PVK3
VM COIL
RW28 68K RD1/4J
QW10 2SC4793
DW03 AM01Z
CW15 22/160 CE-M
RW29 330 RD1/8J
RW32 43 RD1/2J
VM P.W.B.

- All DC voltage to be measured with a tester (100kΩ/V). Voltage taken on a complex color bar signal including a standard color bar signal.
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PA1/PA2 CHASSIS CIRCUIT SCHEMATIC DIAGRAM

BASIC CIRCUIT DIAGRAM

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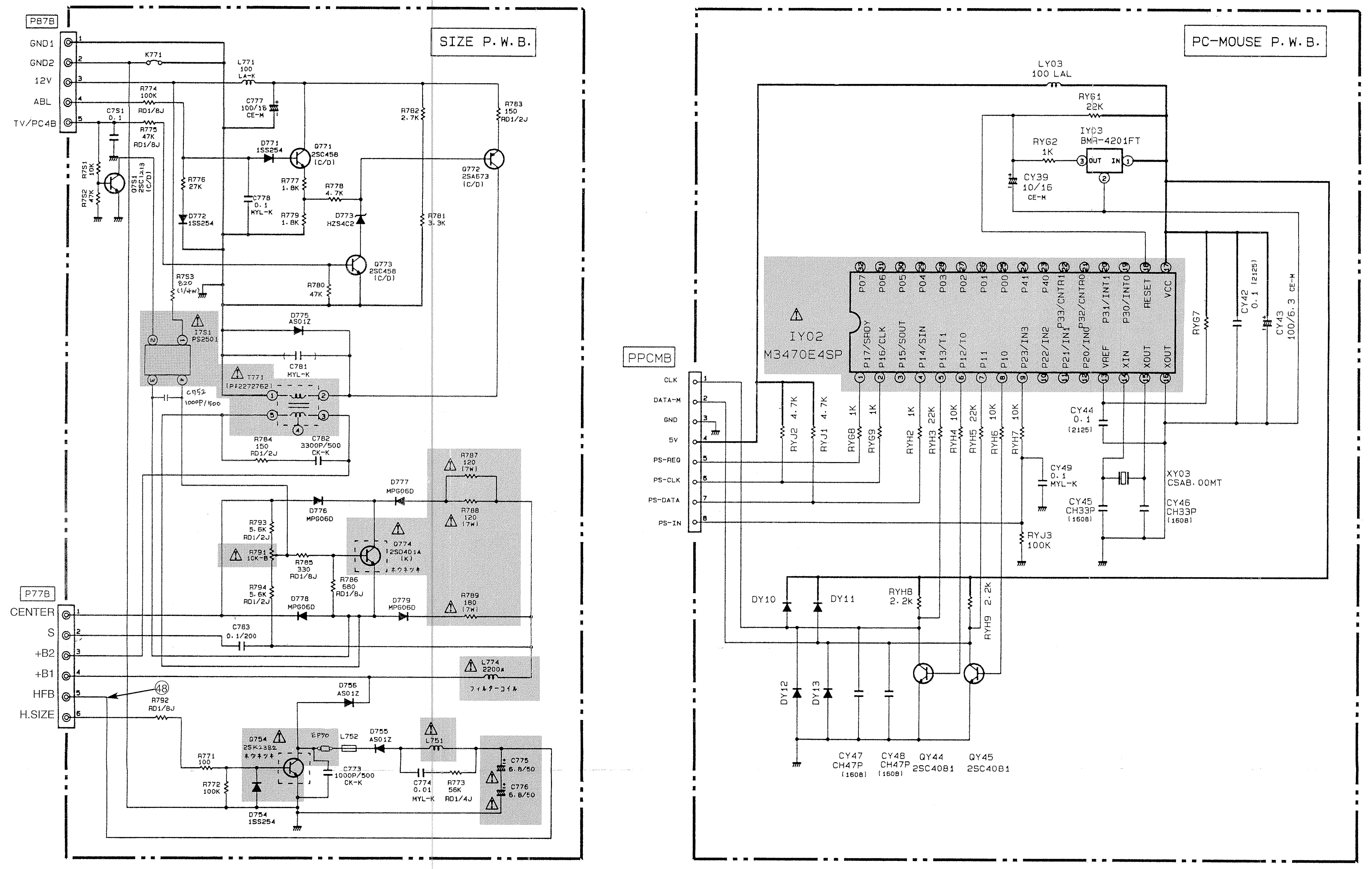
1
2
3
4
5
6
A
B
C
D
E
SIZE P.W.B.
PC-MOUSE P.W.B.
P87B
GND1
GND2
12V
ABL
TV/PC4B
P77B
CENTER
S
+B2
+B1
HFB
H.SIZE
PPCMB
CLK
DATA-M
GND
5V
PS-REQ
PS-CLK
PS-DATA
PS-IN
K771
L771 100 LA-K
R774 100K RD1/8J
C7S1 0.1
R775 47K RD1/8J
R7S1 10K
R7S2 47K
Q7S1 2SC1913 (C/D)
C777 100/16 CE-M
D771 1SS254
Q771 2SC458 (C/D)
R776 27K
D772 1SS254
C778 0.1 MYL-K
R777 1.8K
R778 4.7K
R779 1.8K
D773 HZS4C2
R782 2.7K
R783 150 RD1/2J
Q772 2SA673 (C/D)
R781 3.3K
Q773 2SC458 (C/D)
R780 47K
R7S3 820 (1/4W)
I7S1 PS2501
D775 AS01Z
C781 MYL-K
T771 (PF2272762)
C952 1000P/500
R784 150 RD1/2J
C782 3300P/500 CK-K
R787 120 (7W)
D777 MPG06D
D776 MPG06D
R788 120 (7W)
R793 5.6K RD1/2J
R791 1CK-B
R785 330 RD1/8J
Q774 2SD401A (K)
R786 680 RD1/8J
R794 5.6K RD1/2J
D778 MPG06D
D779 MPG06D
R789 180 (7W)
C783 0.1/200
L774 2200A
R792 RD1/8J
D756 AS01Z
Q754 2SK1382
EP70
L752
D755 AS01Z
L751
C775 6.8/50
C776 6.8/50
R771 100
R772 100K
C773 1000P/500 CK-K
C774 0.01 MYL-K
R773 56K RD1/4J
D754 1SS254
LY03 100 LAL
RYG1 22K
IY03 BMR-4201FT
RYG2 1K
CY39 10/16 CE-M
IY02 M3470E4SP
P07
P06
P05
P04
P03
P02
P01
P00
P41
P40
P33/CNTR1
P32/CNTR0
P31/INT1
P30/INT0
RESET
VCC
P17/SRDY
P16/CLK
P15/SOUT
P14/SIN
P13/T1
P12/T0
P11
P10
P23/IN3
P22/IN2
P21/IN1
P20/IN0
VREF
XIN
XOUT
XOUT
RYG7
CY42 0.1 (2125)
CY43 100/6.3 CE-M
RYJ2 4.7K
RYJ1 4.7K
RYG8 1K
RYG9 1K
RYH2 1K
RYH3 22K
RYH4 10K
RYH5 22K
RYH6 10K
RYH7 10K
CY44 0.1 (2125)
CY49 0.1 MYL-K
XY03 CSA8.00MT
CY45 CH33P (1608)
CY46 CH33P (1608)
RYJ3 100K
DY10
DY11
RYH8 2.2K
RYH9 2.2K
DY12
DY13
CY47 CH47P (1608)
CY48 CH47P (1608)
QY44 2SC4081
QY45 2SC4081

circuit no.	pin no.	DC voltage	
		TV mode	PC mode
Q7S1	b	0.68v	0v
	c	0v	12.74v
	e	0v	0v
Q771	b	2.28v	2.82v
	c	12v	12.16v
	e	1.56v	1.92v
Q772	b	4v	5.45v
	c	3v	0v
	e	4.66v	6.12v
Q773	b	0.67v	0
	c	0v	3.94v
	e	1.56v	0v
Q774	b	120v	124.1v
	c	174v	141.1v
	e	120v	123.6
Q754	b	1.75v	2
	c	88.8v	80v
	e	0v	0v

circuit no.	pin no.	TV mode	PC mode
I7S1	1	1.22v	12.72v
	2	0v	12.77v
	3	120v	123.7
	4	120v	125v

circuit no.	pin no.	DC voltage
IY03	1	4.97v
	2	0v
	3	4.96v
QY44	b	0v
	c	4.97v
	e	0v
QY45	b	0v
	c	4.97v
	e	0v

circuit no.	pin no.	DC voltage
		PC mode
IY02	1	4.94v
	2	4.98v
	3	4.96v
	4	4.98v
	5	4.96v
	6	0v
	7	4.96v
	8	0v
	9	0v
	10	0v
	11	0v
	12	0v
	13	4.95v
	14	2.25v
	15	2.18v
	16	0v
	17	4.97v
	18	4.96v
	19	0.9v
	20	0v
	21	0v
	22	0v
	23	0v
	24	0v
	25	0v
	26	0v
	27	0v
	28	0v
	29	0v
	30	0v
	31	0v
	32	0v

- All DC voltage to be measured with a tester (100kΩ/V). Voltage taken on a complex color bar signal including a standard color bar signal.
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PA1/PA2 CHASSIS CIRCUIT SCHEMATIC DIAGRAM

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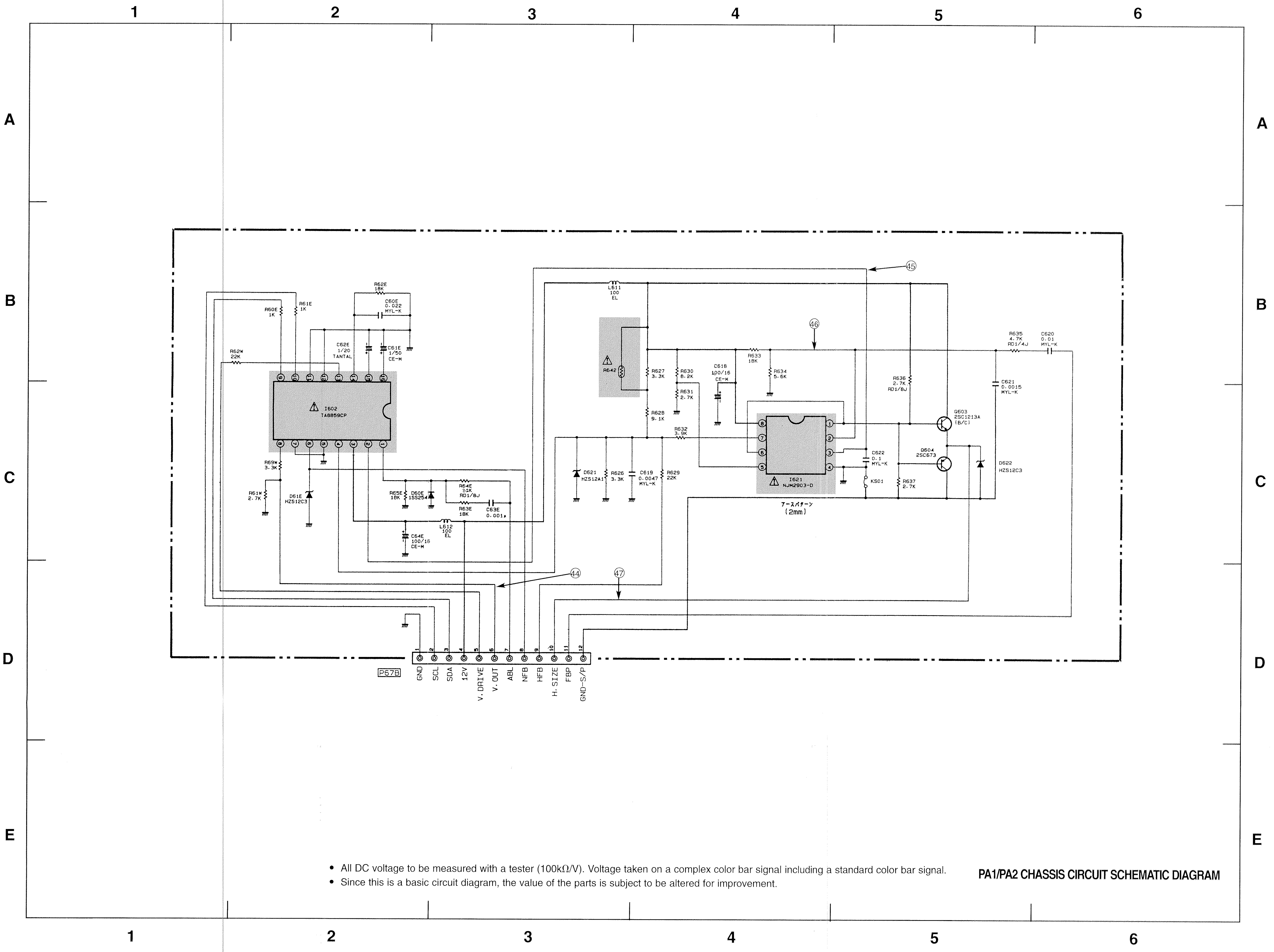
BASIC CIRCUIT DIAGRAM

circuit no	pin no.	DC voltage
I602	1	2.32v
	2	5.86v
	3	3.75v
	4	2.97v
	5	0v
	6	0v
	7	3.6v
	8	4.5v
	9	1.63v
	10	0v
	11	4.08v
	12	0v
	13	4.32v
	14	11.7v
	15	1.48v
	16	1.74v

circuit no.	pin no.	DC voltage
I621	1	1.58v
	2	2.8v
	3	1.47v
	4	0v
	5	2.94v
	6	1.59v
	7	3.37v
	8	11.7v

circuit no.	pin no.	DC voltage
Q603	b	1.58v
	c	11.72v
	e	1.45v
Q604	b	1.58v
	c	0v
	e	1.45v


1
2
3
4
5
6
A
B
C
D
E
R62E 18K
C60E 0.022 MYL-K
R60E 1K
R61E 1K
C62E 1/20 TANTAL
C61E 1/50 CE-M
R62W 22K
I602 TA8859CP
R69W 3.3K
R61W 2.7K
D61E HZS12C3
R65E 18K
D60E 1SS254
R64E 82K RD1/8J
R63E 18K
C63E 0.001μ
C64E 100/16 CE-M
L612 100 EL
L611 100 EL
R642
R627 3.3K
R630 8.2K
R631 2.7K
R628 9.1K
C618 100/16 CE-M
R633 18K
R634 5.6K
R632 3.9K
D621 HZS12A1
R626 3.3K
C619 0.0047 MYL-K
R629 22K
I621 NJM2903-D
C622 0.1 MYL-K
KS01
R636 2.7K RD1/8J
R637 2.7K
Q603 2SC1213A (B/C)
Q604 2SC673
D622 HZS12C3
R635 4.7K RD1/4J
C620 0.01 MYL-K
C621 0.0015 MYL-K
アースパターン
(2mm)
㊹
㊺
㊻
㊼
P57B
1 GND
2 SCL
3 SDA
4 12V
5 V.DRIVE
6 V.OUT
7 ABL
8 NFB
9 HFB
10 H.SIZE
11 FBP
12 GND-S/P

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PA1/PA2 CHASSIS CIRCUIT SCHEMATIC DIAGRAM

NOTES:

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